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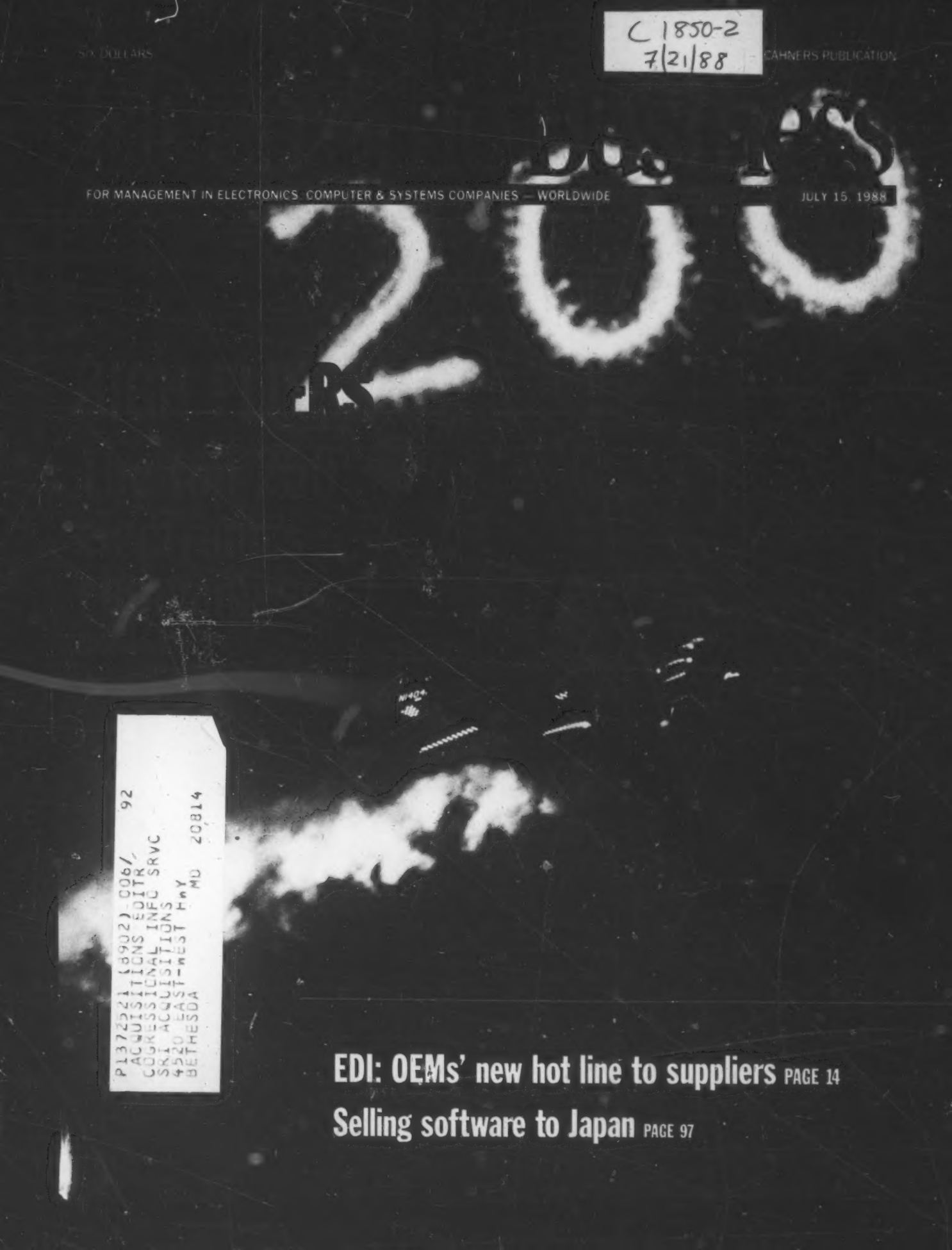
FOR MANAGEMENT IN ELECTRONICS, COMPUTER & SYSTEMS COMPANIES — WORLDWIDE

JULY 15, 1988



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Electronic Business

FOR MANAGEMENT IN ELECTRONICS, COMPUTER AND SYSTEMS COMPANIES—WORLDWIDE

VOL. 14, NO. 14 JULY 15, 1988

Cover Story

THE ELECTRONIC BUSINESS 200

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After the exuberant highs of the early days and then the shocking reversal in 1985, the electronics industry is finally settling down. No longer driven by uncontrolled growth, the new, mature industry is more interested in expanding profits than revenue.

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Mastering the 200

This will be the fourth consecutive year that ELECTRONIC BUSINESS has published "The 200," our annual ranking of the top 200 publicly held companies in the American electronics industry.

To our knowledge, this is the only such ranking in the industry. We are proud of it, and proud of senior editor Linda Stallmann who — with the help of assistant editor Sherri Hartlen — sifts through hundreds of annual reports and other financial documents each year in order to compile it. After four years, the 200 has become a kind of fixture in the industry itself — a measure by which firms chart their progress or decline. And, as assistant managing editor Beth Karlin points out in her accompanying cover story, there are also indications in that list of where the industry may be headed in the year ahead.

This was, after all, the year of the bottom line. For the top 200 companies, profitability soared 50% in 1987, after two straight years of decline. What these figures suggest is that many U.S. companies are more concerned these days — and correctly so — about steady profits than they are about escalating revenue. Perhaps this is a sign of maturity.

In any event, we at ELECTRONIC BUSINESS were cheered by what we learned. So to celebrate the event, we even hired a biplane to write the number "200" in the skies over Massachusetts. Photos from that session accompany the article.

I guess what this all proves is that even though the U.S. electronics industry is fairly mature, we at ELECTRONIC BUSINESS are not above a little wackiness from time to time. We hope you enjoy our aerial acrobatics as much as we do.

EB's skywriter Paul Richter at the controls of his biplane

The 200 on a disk

We would be remiss too if we didn't point out that the 200, as usual, is available on a disk — in a handy IBM-compatible Lotus format or an Apple Macintosh Excel version. The price: $50, and cheap at that, if you're like most executives these days and like to fool around with numbers on a spreadsheet.

So, if you'd like to purchase a copy of the disk, please write to us at: "200 on a disk," ELECTRONIC BUSINESS, 275 Washington Street, Newton, Mass., 02158, and include a check or money order. We promise to process your order as quickly as possible.

AL FURST, Editor

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U.S. component suppliers miss the flat-panel TV show

By 1993, new LCD TVs will fuel a $730 million market for components. U.S. vendors are unlikely to benefit

Better liquid crystal displays (LCDs) are waking up the flat panel display market. The new screens are appearing not only in small computers, but increasingly in TVs, opening up major opportunities for suppliers of everything from interconnects and fine-line circuit boards to smaller, more efficient power supplies and the semiconductors that drive the displays.

Indeed, demand for flat-panel computer displays alone is pushing a market for materials and components that is growing anywhere from 20% to 25% annually, and which, according to Electronic Materials Report, a newsletter published in Los Altos, Calif., will be worth $730 million by 1993. The market for flat-panel TV display parts should be bigger still.

But so far, U.S. suppliers, constrained by America's pullout from consumer electronics, have scarcely a look-in. With Japan dominating the current LCD market, most suppliers of LCD materials and components are in Japan too.

One of the few U.S. manufacturers of LCD displays — Alphasil Inc. of Fremont, Calif. — sources its neon fluorescent backlighting, 320-pin-count boards and power supplies domestically, but says it has found no U.S. companies interested in supplying the ICs to drive the displays. Alphasil uses SMOS devices in 100-pin flatpacks. "There's potential to sell millions of those," says Thomas Stahl, Alphasil's director for sales and marketing. He notes that some producers from Taiwan have been in to talk to Alphasil about supplying drivers, spurred by some difficulty in Taiwan getting LCDs and drivers from Japan.

Yet, the market is there. Sales of sophisticated high information content flat-panel displays suitable for televisions and computers will reach $750 million this year, and nearly $2 billion by 1993, according to Stanford Resources Inc. of San Jose.

Sparking this enthusiasm are better liquid crystal displays. Back-lit LCDs have given reasonably priced laptop computers readable screens. Now the new neutral twist nematic (NTN) technology provides much higher contrast. Major suppliers are Hitachi Ltd., Toshiba Corp. and Seiko Epson.

"As the third-generation laptops come out in 1988, I think this NTN technology will be significantly preferred," says Thomas B. Martin, assistant vice president of the computer business unit of NEC Home Electronics (U.S.A.) Inc. in Wood Dale, Ill. NEC is expected to announce a portable with the new technology soon. Zenith Data Systems Corp. of Mount Prospect, Ill., and Grid Systems Corp. of Mountain View, Calif., have announced models.

Sony's 6-ineh color LCD TV

LCD televisions have made big strides, too. Antidumping duties have so far kept the new generation of 5-inch diagonal sets with better picture quality out of the United States. Sony Corp. recently announced it would have a 6-inch active matrix color set on the market by the end of the year, probably selling for under $800. Between 1.5 million and 2 million LCD TVs are expected to sell in Japan this year. Stanford Resources predicts sales of 10 million units by 1994, and 12-to-14 inch sizes by the mid-1990s. Already this year, the market for flat-panel displays for televisions will be bigger than for computers.

Unlike the early LCD televisions made by simpler technologies by watch and calculator companies, this new generation is being legitimized by the major Japanese electronics companies using active matrix thin-film transistor LCDs. The ultimate LCD, an active matrix device, can be as bright and as fast as a CRT, while still as flat and as low power as a conventional LCD.

While the Japanese consumer electronics giants are trying to bring their low-cost TV displays up to full size and quality, some U.S. companies are trying to bring their military active matrix displays down to prices civilians can afford.

Alphasil claims that by sticking strictly to standard IC industry materials and processes, it can make 5-inch by 5-inch CRT-quality displays now, and could make 10-inch by 10-inch displays by simply using a bigger mask aligner. Its displays, however, cost several thousand dollars each, and larger ones would cost tens of thousands. "When we get to 10 by 10," asserts marketing chief Stahl, "this [active matrix technology] could totally replace CRTs. That will be within five years."

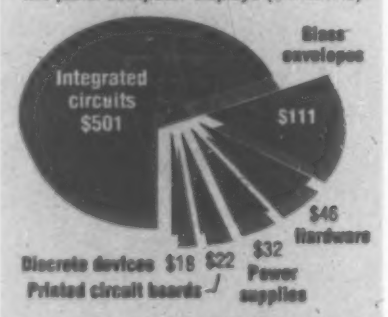
These various types of enhanced LCDs were only 10% of the $204 million market for displays for portable microcomputers last year, says Stanford Resources, but will jump to 45% of the $325 million 1989 market.

However, at least one U.S. electronic materials supplier does see big opportunity in the advanced LCD market. Corning Glass Works in Corning, N.Y., claims a 95% share of the growing Japanese market for the precision glass substrate for active matrix LCDs. Now the U.S. company is spending a third of its capital budget on the business, building a new plant in Japan and planning a research laboratory.

PAULA DOE

Flat-panel computer displays

Market for materials and components for flat-panel computer displays ($ millions)



Total 1993 market: $730 million

Source: Electronic Materials Report

1993 sales of parts for LCD TVs could be even higher than the $730 million for LCD computer screens

The 200 Sky-high and heading higher

The signs are positive. Total net income for the 200 leaders rose more than 50% to $41 billion after two years of declining growth

After the exuberant highs of the early days and then the shocking reversal in 1985, the electronics industry is finally settling down. No longer driven by uncontrolled growth, the new, mature industry is more interested in expanding profits than revenue. Today's cautious managers now see that the wild growth that turned so many start-ups into market leaders also ultimately turned many market leaders into losers.

This message is especially clear to executives whose companies have significantly increased their standings in this year's ELECTRONIC BUSINESS 200. Of the top 200 electronics companies ranked annually by this magazine, 98 firms advanced on the list this year over positions they previously held, and 21 companies joined the list.

"Profits are our No. 1 concern; size is way down the list," says E. Paul Eder, senior vice president of Anthem Electronics Inc., a leading distributor. "We would rather be a profitable midsized company than a large also-ran." This year, Anthem rose 36 slots on the ELECTRONIC BUSINESS 200 — to No. 162.

Eder echoes the sentiments of many executives. Indeed, in 1987 the industry's top performers kept both eyes sharply focused on the bottom line. As a result, total net income for the 200 leaders rose more than 50% to $41.0 billion after two years of declining growth, according to the ELECTRONIC BUSINESS 200. Electronics sales, by comparison, grew 7% to $298.5 billion for the calendar year. Since 1983, sales have risen 10.7% compounded annually. Net income, meanwhile, has increased 13.9% a year during the five years. ▷

BY BETH KARLIN and LINDA STALLMANN

The ELECTRONIC BUSINESS 200 is an exclusive report by ELECTRONIC BUSINESS magazine analyzing the financial statements of the 200 largest United States-based computer and electronics manufacturers. It is based on a careful analysis of hundreds of annual reports, 10-K Reports, interviews with company executives and estimates developed internally at the magazine. As such, the 200 — which only includes publicly held companies — provides an accurate gauge of the current status and future direction of the U.S. electronics industry.

And the prognosis is good. After spending two years streamlining operations, many of the ELECTRONIC BUSINESS 200 are well positioned for steady growth. And those that aren't are rapidly moving in that direction (see accompanying story). To see what the successful ones are doing right, ELECTRONIC BUSINESS closely studied the strategies of companies that vastly improved their standings in the ELECTRONIC BUSINESS 200 between 1986 and 1987.

For example, workstation maker Sun Microsystems Inc., with the largest sales growth rate this year, moved up 28 spots to No. 65. And Mark IV Industries Inc., a diversified manufacturer of industrial products — and next fastest growing — jumped 67 positions on our listing — to spot 113. Along the way, however, these companies didn't blindly sacrifice profits at the altar of revenue. Indeed, Sun's net income nearly doubled in 1987, while Mark IV's climbed almost 80%. "Our goal is to repeat what we have done well, learn from our mistakes and produce real returns at the operating unit level of a minimum of 15% of sales," says Sal H. Alfiero, Mark IV chairman.

Not by chance

Growth like this doesn't happen by chance. Rather, the winners have carefully orchestrated their successes. Key to that success is implementation of strict financial controls and an emphasis on profits.

"It takes strong concentration to focus on specific products or niches with profit potential when most of the competition is chasing sales volume," says Jerry Kalov, president of Dynascan Corp., a Chicago consumer electronics company that went from a $17 million loss from continuing operations in 1984 to a $6.6 million profit in 1987. "But if a product doesn't make a profit, we won't sell it." While that may seem obvious, many electronics companies owe their demise to aggressive marketing of products for all the wrong reasons — merely to expand their product lines, for example, or to get into new market segments without regard for profit potential.

No longer. In 1987, the emphasis on the bottom line forced many companies to completely rethink their corporate philosophies. While strate-

COMPOSITE PERFORMANCE OF THE ELECTRONIC BUSINESS 200

	1983	1984	Percentage change	1985	Percentage change	1986	Percentage change	1987	Percentage change
Electronic sales ($ billions)	$225.9	$256.2	+13.4%	$267.8	+4.5%	$279.2	+4.3%	$298.5	+6.9%
Total sales ($ billions)	$732.5	$776.5	+6.0%	$797.8	+2.7%	$641.7	-19.6%	$689.0	+7.4%
Net income ($ billions)	$37.4	$46.4	+24.1%	$35.4	-23.7%	$26.7	-24.6%	$41.0	+53.6%
Weighted averages:									
Return on equity	13.8%	16.5%	—	11.8%	—	10.2%	—	14.1%	—
Return on investment	10.2%	12.6%	—	8.7%	—	7.2%	—	10.2%	—
Cost of goods sold as a percentage of sales	70.0%	69.4%	—	70.3%	—	63.7%	—	61.5%	—
R&D as a percentage of sales	4.1%	4.2%		4.2%		5.0%		5.2%	—
Sales per employee	$97,300	$103,200	+6.1%	$110,800	+7.4%	$102,348	-7.6%	$113,450	+10.8%
Net income per employee	$5,100	$6,300	+23.5%	$5,000	-20.6%	$4,266	-14.7%	$6,663	+56.2%
5-year compound growth:									
Sales	+8.5%	+8.5%	—	+5.0%	—	+8.2%	—	+10.7%	—
Net income	+7.3%	+11.6%	—	+1.4%	—	+4.0%	—	+13.9%	—
Capital outlay to net cash flow after dividends	89.8%	96.0%	—	118.3%	—	97.9%	—	73.9%	—
Debt as a percentage of total capital	26.1%	23.5%	—	26.7%	—	29.9%	—	28.1%	—
Foreign sales as a percentage of sales	—	—	—	14.0%	—	25.4%	—	24.7%	—

gies vary from company to company, some clear patterns emerged among the winners. Fast-track managers tend to implement a combination of the following practices, tailoring their strategy to fit the individual needs of their companies. To continue to increase profits and revenue in an uncertain business climate, they have:

- Held tight reins on inventories
- Spread risk through diversification
- Expanded international sales and operating bases
- Consolidated manufacturing and trimmed workforces
- Pruned unprofitable or extraneous businesses
- Added product lines through internal development, joint ventures or acquisitions.

In some cases, firms vastly increased their size and ELECTRONIC BUSINESS 200 ranking largely by devouring new companies and adding sales to the corporate total. Computer and video-game manufacturer Atari Corp., for example, acquired the Federated Group Inc., a consumer electronics retail chain for $64 million. It is also seeking to acquire a semiconductor facility or, at least, to form an alliance with a chip company. And West Amherst, New York-based Mark IV purchased diversified Conrac Corp., for $185 million; and the Eagle Signal Controls Division of Wickes, for $16 million. In keeping with its strategy to manufacture only proprietary products, Mark IV at the same time got rid of its Engineered Magnetics business and its polystyrene and rubber-producing plants.

Strategic fit

San Jose-based Anthem expanded to the Northeast with the purchase of distributor Lionex Corp. And Olin Corp., Stamford, Conn., bought Aegis Inc., a supplier to the hybrid microelectronics industry, while divesting its firearm manufacturing business, among others. "Focusing on profit detractors continues to be a major strategic emphasis," says John W. Johnstone Jr., president of the Stamford, Conn., electronic materials and services, metals and chemicals company. "The issue of strategic fit must be addressed. There are no sacred cows at Olin."

The stepped-up pace of mergers and acquisitions in the electronics sector is also expected to continue. Dynascan, for one, intends to each year buy a company worth more than $25 million. In 1987, it completed the acquisition of Marantz Co., transforming the faltering audio equipment maker into a profitable business. The same year, Dynascan also sold off its industrial control and test equipment operations to concentrate solely on consumer electronics.

Despite Wall Street's generally negative attitude toward consumer electronics, Dynascan believes it can be a gold mine for those with the right strategy. "It's a terrific place to grow profitably by following selective nichemanship," says Kalov. For Dynascan, that "nichemanship" means never being a pioneer and never going up against the giants. "We do not want to be first; that requires substantial investment," explains Kalov. "We prefer to watch the market develop, begin to mature and learn from the mistakes of others." Dynascan's products include Cobra brand telephones, auto radar detectors, CB radios, stereo equipment and facsimile machines.

Nichemanship

These days, nichemanship can mean the difference between winning and losing. LSI Logic Corp., Milpitas, Calif., is betting that by transforming into an application-specific integrated circuit systems supplier it will cash in on the fast-growing ASIC business in the 1990s.

Mark IV, meanwhile, has targeted small industrial markets, from $20 million to $250 million, thus enabling them to steer clear of the giants. Also, says Alfiero, "the markets we pursue have significant technical and financial thresholds which may reduce the number of small competitors." Mark IV's businesses include everything from microprocessor controls to professional sound systems to telephone answering machines.

Niches don't have to be small, off-the-beaten-track segments. ▷

Can't tell an annual report by its cover

"Changing for the future," announces Cincinnati Milacron Inc. in big, bold red letters on the somber gray cover of its 1987 annual report. NBI Inc., meanwhile, declares: "Change equals opportunity" on the front of its latest report. Indeed, for those firms whose ELECTRONIC BUSINESS 200 standing dropped dramatically last year, change is indeed the name of the game.

In face of sales downturns, troubled companies dramatically restructured operations. They shut down or sold businesses, took painful writeoffs, trimmed workforces, brought in new managers and hoped for the best. "What we did in 1987 was demonstrate our ability to change," says Gary K. Willis, president of Foxboro Inc., a Foxboro, Mass., manufacturer of process control equipment.

GenRad Inc., a Concord, Mass. producer of test and measurement systems, closed the doors of its Semiconductor Test Division, which made high-end VLSI test systems. The cost: $32.5 million. Cleveland-based Eaton Corp. started selling its defense operations. Penn Central Corp., Cincinnati maker of telecommunications, defense and energy products, spun off its Sprague Technologies Inc. electronics businesses. And BRIntec Corp. put its printed circuit board and specialty telephone equipment businesses on the block.

"Restructuring actions were initiated as a strategic response to economic, technological and competitive changes," says Peter Petruchik, president of BRIntec, a Willimantic, Conn., maker of connectors and cable. BRIntec and other survivors of painful restructuring are predicting increased sales and profits in coming years. "We expect earnings growth averaging 12% to 15% a year and return on equity exceeding 20%," predicts Petruchik.

These new, leaner companies don't intend to get caught short again. "Restructuring can never be considered an accomplished fact," says Foxboro's Willis. "It must remain a dynamic process calculated to challenge our performance on a continuing basis." He adds: "The major efforts are behind us."

Compaq Computer Corp., for example, went up against no less of a giant than IBM with commodity products — and managed to surpass $1 billion in sales and $135 million in profits after only five years. Its niche is IBM-clone computers. Indeed, Compaq has become one of the industry's most remarkable success stories by beating IBM at its own game. Houston-based Compaq offers the same technology for less money and also steps in to fill the gaps when IBM leaves a market. By the end of 1987, boasts Rod Canion, Compaq president, "we emerged as a leader in high performance, industry-standard products worldwide."

Being a global leader is increasingly important. LSI Logic's international revenue, for example, last year grew twice as fast as total corporate revenue. And, says James M. McCoy, president of Maxtor Corp., San Jose: "Strengthening our position as a leading factor in the worldwide data storage marketplace is our primary goal." In 1987, the 5-year-old high-capacity disk maker broke ground for a new facility in Singapore and opened its first international direct sales office in Britain. "Boosted particularly by growth in Western Europe, international sales reached nearly $28 million, 16% of total revenues," according to McCoy.

Global leader

Atari, meanwhile, opened sales subsidiaries in Sweden, Spain, Australia and Mexico. The formerly beleaguered electronic game manufacturer has, under the leadership of Jack Tramiel, chairman, become a respected player in international markets for a variety of computer products, software and peripherals. Even its original video game line is making a comeback. Net sales outside North America accounted for 46% of total sales in 1987.

Atari UK reportedly has secured a 40% share of the 16-bit personal computer market in Great Britain. West Germany's Supreme Court keeps track of volumes of courtroom precedents and trial verdicts on Atari equipment. And in France, jazz artist Jean Michel Jarre composes on his Atari ST, taking advantage of Atari's musical instrument digital interface ports that allow musicians to connect synthesizers and instruments to their computers. "Our commitment to an international marketing strategy has resulted in a dramatic increase in European sales," says Tramiel. In fact, he says, European demand for Atari's new personal computers rose so sharply last year the firm was forced to postpone its marketing assault in the United States.

For the ELECTRONIC BUSINESS 200 as a whole, foreign sales accounted for about 25% of total corporate sales, about the same as last year but up dramatically from 14% two years ago. In many cases, unit sales growth was higher, but losses resulting from the weak dollar in many markets shrouded real growth.

For two straight years, foreign sales accounted for 25% of the 200's total revenue

Having a worldwide base not only moves engineering and manufacturing operations closer to customers, it also enables a company to compensate for a cyclical downturn in one geographical area with sales to another, economically stronger location. "Being global makes us less vulnerable to protectionism and it shields us, in part at least, from the effect of swings in currency values," says T. Kevin Dunnigan, president of components maker Thomas & Betts Corp. "Becoming truly multinational is a complex problem, but the long-term advantages make the effort worthwhile."

Those long-term advantages will be most noticeable on a firm's bottom line. And as the electronics industry grows from the wild child of the early years to the mature industry of the 1990s, the bottom line will continue to be the most important consideration. Mark IV chairman Alfiero spoke for many successful electronics executives in outlining his firm's objectives: "Our goals are to strengthen our balance sheet, to work with our existing operations to enhance profitability and to watch for opportunities to expand and excel." □

Notes to the 200

Revenue
Revenue includes sales of products, services and rentals, but excludes dividends, interest and other nonoperating revenue.

Profit
Profits are shown after taxes from continuing operations and before extraordinary items.

Return on equity
ROE is profits as a percentage of shareholders' equity — preferred stock, capital stock, surplus and retained earnings at year-end.

Return on investment
ROI is profits as a percentage of shareholders' equity plus short- and long-term debt. Short-term debt includes the current portion of long-term debt, notes payable and other borrowings.

Cost of goods sold
This includes manufacturing costs of products, services and rentals sold, less depreciation.

Research and development
R&D is company-sponsored research and development expenses as a percentage of revenue.

Employees
The number of employees is supplied by each company. In most cases this number represents year-end employment.

Capital expenditures to net cash flow
Capital expenditures are measured as a percentage of net profits plus depreciation, minus cash dividends paid.

Debt to total capital
This includes long-term debt plus short-term debt as a percentage of shareholders' equity and long- and short-term debt.

Foreign sales
These include sales of operations outside the United States to unaffiliated customers and U.S. operations' export sales.

THE ELECTRONIC BUSINESS 200

FINANCIAL TABLES

Ranking: 1 - 50

Rank 1987	Rank 1986	Company	Calendar year 1987 Electronics revenue ($ millions)	Calendar year 1987 Total revenue ($ millions)	Calendar year 1987 Net income ($ millions)	Fiscal year 1987 Total revenue ($ millions)	Fiscal year 1987 Net income ($ millions)	Return on equity	Return on investment
1	1	**IBM**	$54,217.0	$54,217.0	$5,258.0	$54,217.0	$5,258.0	13.7%	12.0%
2	2	**AT&T**	16,062.0	33,598.0	2,044.0	33,598.0	2,044.0	14.1%	9.1%
3	4	**GM Hughes Electronics**	10,481.0	10,481.0	521.1	10,481.0	521.1	7.4%	6.7%
4	5	**Digital Equipment**	10,391.1	10,391.1	1,284.2	9,389.4	1,137.4	18.1%	17.3%
5	7	**Unisys**	9,712.9	9,712.9	578.0	9,712.9	578.0	12.7%	8.7%
6	3	**General Electric**	9,514.0	39,315.0	2,915.0	39,315.0	2,119.0	12.9%	9.6%
7	6	**Xerox**	8,980.0	10,320.0	578.0	10,320.0	578.0	10.4%	7.5%
8	8	**Hewlett-Packard**	8,542.0	8,542.0	707.0	8,090.0	644.0	12.8%	10.6%
9	11	**Motorola**	6,707.0	6,707.0	308.0	6,707.0	308.0	10.2%	8.3%
10	12	**Honeywell**	6,679.3	6,679.3	253.7	6,679.3	253.7	11.3%	7.0%
11	14	**NCR**	5,640.7	5,640.7	419.3	5,640.7	419.3	19.4%	17.7%
12	13	**Texas Instruments**	5,594.5	5,594.5	256.9	5,594.5	256.9	11.4%	9.2%
13	10	**Lockheed**	5,241.6	11,321.0	436.0	11,321.0	436.0	20.9%	7.2%
14	15	**Raytheon**	4,740.0	7,659.4	445.1	7,659.4	445.1	24.1%	19.0%
15	17	**Eastman Kodak**	4,435.0	13,305.0	1,178.0	13,305.0	1,178.0	19.6%	14.3%
16	16	**Rockwell International**	4,423.7	11,936.5	678.6	12,123.4	635.1	19.2%	15.0%
17	19	**Tandy**	3,654.7	3,654.7	289.8	3,452.2	242.3	17.6%	15.3%
18	9	**Allied-Signal**	3,380.0	11,116.0	515.0	11,116.0	515.0	16.5%	9.1%
19	20	**TRW**	3,192.0	6,821.0	243.0	6,821.0	243.0	17.1%	9.4%
20	23	**Litton Industries**	3,191.7	4,735.5	151.3	4,419.7	138.1	13.1%	10.8%
21	22	**Wang Laboratories**	3,047.6	3,047.6	94.5	2,836.7	70.7	4.8%	3.1%
22	31	**Apple Computer**	3,041.3	3,041.3	280.4	2,661.1	217.5	26.0%	26.0%
23	28	**Martin Marietta**	2,960.2	5,165.1	230.7	5,165.1	230.7	25.4%	18.3%
24	26	**Ford Motor**	2,786.9	71,643.4	4,625.2	71,643.4	4,625.2	25.1%	21.0%
25	25	**3M**	2,698.0	9,429.0	918.0	9,429.0	918.0	18.1%	15.9%
26	21	**Control Data**	2,667.5	3,366.5	21.5	3,366.5	25.0	2.4%	1.7%
27	27	**ITT**	2,662.6	19,525.0	1,018.0	8,551.0	1,018.1	13.0%	9.5%
28	24	**Westinghouse Electric**	2,563.0	10,679.0	738.9	10,679.0	738.9	20.7%	12.4%
29	34	**Zenith Electronics**	2,362.7	2,362.7	-19.1	2,362.7	-19.1	-4.0%	-2.1%
30	29	**Harris**	2,100.1	2,100.1	92.2	2,079.0	84.5	8.6%	7.4%
31	36	**Pitney Bowes**	2,009.2	2,250.5	199.4	2,250.5	199.4	19.2%	13.5%
32	37	**Du Pont**	2,000.0	30,468.0	1,786.0	30,468.0	1,786.0	12.5%	9.4%
33	33	**Boeing**	1,980.0	15,355.0	480.0	15,355.0	480.0	9.6%	9.1%
34	40	**AMP**	1,912.0	2,317.8	249.7	2,317.8	249.7	18.5%	16.3%
35	48	**Intel**	1,907.1	1,907.1	175.5	1,907.1	175.5	13.4%	8.5%
36	39	**National Semiconductor**	1,877.7	1,877.7	-28.8	1,867.9	-28.8	-3.2%	-2.9%
37	38	**McDonnell Douglas**	1,810.0	13,344.5	313.0	13,344.5	313.0	10.5%	6.9%
38	32	**GTE**	1,784.2	15,421.0	1,118.8	15,421.0	1,082.0	11.3%	5.4%
39	45	**Emerson Electric**	1,770.0	6,317.5	482.8	6,170.3	467.2	17.3%	12.9%
40	41	**Singer**	1,618.0	1,902.7	23.4	1,902.7	23.4	3.7%	1.5%
41	52	**Amdahl**	1,505.2	1,505.2	142.0	1,505.2	142.0	18.5%	15.4%
42	47	**Avnet**	1,482.0	1,670.7	37.3	1,547.1	22.8	3.5%	2.6%
43	42	**United Technologies**	1,420.0	17,170.2	591.7	17,170.2	591.7	10.3%	7.2%
44	44	**Tektronix**	1,388.9	1,388.9	25.7	1,395.9	51.2	6.1%	5.7%
45	46	**Data General**	1,303.9	1,303.9	-75.9	1,274.3	-82.9	-14.1%	-11.7%
46	50	**Perkin-Elmer**	1,233.0	1,377.8	-9.6	1,333.6	-18.2	-2.6%	-2.0%
47	69	**Compaq Computer**	1,224.1	1,224.1	136.3	1,224.1	136.3	34.1%	24.8%
48	43	**Teledyne**	1,222.0	3,216.8	377.2	3,216.8	377.2	19.1%	14.9%
49	49	**Northrop**	1,124.5	6,052.5	94.2	6,052.5	94.2	9.9%	5.0%
50	57	**General Instrument**	1,104.0	1,104.0	53.6	787.9	18.5	4.0%	2.8%

NA = not available

NM = not meaningful

Fiscal year 1987				Five-year growth (Compounded average annual growth rate)					
Cost of goods as a percentage of revenue	R&D as a percentage of revenue	Revenue per employee ($ thousands)	Net income per employee ($ thousands)	Revenue	Net income	Capital outlays to net cash flow after dividends	Debt as a percentage of total capital	Foreign revenue as a percentage of total revenue	Fiscal year ended
38.9%	10.0%	$139.3	$13.5	9.5%	3.6%	70.2%	12.5%	54.0%	12/87
38.2%	7.3%	110.9	6.7	NA	NA	82.3%	35.2%	NA	12/87
72.3%	4.0%	104.8	5.2	NA	NA	56.1%	9.7%	11.6%	12/87
22.3%	10.8%	85.0	10.3	19.3%	22.2%	47.6%	4.2%	47.0%	6/87
32.5%	6.1%	105.0	6.2	18.9%	33.4%	75.4%	31.6%	43.6%	12/87
71.5%	3.1%	130.2	7.0	7.7%	3.4%	71.5%	25.4%	23.4%	12/87
45.1%	7.0%	104.2	5.8	5.3%	47.8%	97.3%	27.9%	44.9%	12/87
42.6%	11.1%	98.7	7.9	14.1%	11.0%	54.8%	17.5%	49.0%	10/87
53.2%	7.8%	68.6	3.2	12.1%	12.6%	91.5%	19.4%	43.8%	12/87
66.8%	4.3%	84.7	3.2	11.3%	6.6%	53.0%	38.4%	20.6%	12/87
48.8%	6.3%	91.0	6.8	9.9%	12.4%	62.4%	9.0%	54.6%	12/87
71.5%	7.7%	71.7	3.3	5.3%	12.3%	82.0%	19.7%	31.5%	12/87
89.7%	4.8%	114.0	4.4	15.1%	16.1%	53.9%	65.5%	8.0%	12/87
76.9%	3.5%	100.1	5.8	8.0%	8.0%	64.6%	21.1%	17.1%	12/87
52.7%	7.5%	107.0	9.5	4.2%	0.3%	103.2%	26.9%	42.8%	12/87
74.8%	3.5%	104.4	5.5	10.4%	13.9%	50.2%	21.6%	15.1%	9/87
47.4%	0.0%	88.5	6.2	13.5%	1.6%	34.3%	12.6%	1.6%	6/87
77.0%	6.0%	96.4	4.5	17.8%	12.9%	108.6%	44.6%	19.3%	12/87
73.1%	4.8%	87.6	3.1	8.9%	7.4%	100.0%	45.4%	25.7%	12/87
76.1%	4.7%	81.5	2.5	2.1%	-14.0%	84.7%	17.7%	22.7%	7/87
27.1%	7.5%	93.6	2.3	19.6%	-8.0%	42.8%	33.8%	40.1%	6/87
46.1%	7.2%	475.2	38.8	35.5%	28.8%	31.6%	0.0%	27.1%	9/87
76.5%	4.3%	73.8	3.3	11.2%	16.9%	77.9%	27.9%	NA	12/87
77.2%	3.5%	204.5	13.2	14.1%	NM	51.7%	16.5%	NA	12/87
52.5%	6.6%	115.0	11.2	7.4%	7.8%	77.9%	12.1%	39.8%	12/87
63.3%	11.6%	97.6	0.7	1.1%	-30.6%	73.8%	29.6%	20.0%	12/87
77.4%	2.2%	71.3	8.5	-11.7%	7.7%	37.2%	27.2%	52.4%	12/87
70.3%	2.0%	94.9	6.6	1.8%	10.5%	51.0%	39.8%	20.6%	12/87
83.7%	4.4%	67.5	-0.5	13.8%	NM	247.3%	47.7%	17.2%	12/87
58.8%	5.7%	85.6	3.5	4.8%	1.1%	39.7%	13.8%	14.7%	6/87
31.7%	2.9%	76.4	6.8	10.0%	17.5%	88.9%	29.5%	19.5%	12/87
49.0%	4.0%	217.4	12.7	1.0%	14.8%	100.1%	25.0%	49.8%	12/87
84.8%	5.4%	112.8	3.5	-11.2%	10.5%	96.2%	5.1%	40.9%	12/87
56.8%	8.8%	105.4	11.3	13.3%	16.0%	57.6%	12.2%	52.3%	12/87
45.7%	13.6%	99.3	9.1	16.2%	42.4%	86.9%	36.5%	38.8%	12/87
62.1%	11.7%	64.0	-1.0	11.1%	NM	79.2%	11.3%	42.1%	5/87
76.7%	4.9%	118.7	2.8	12.5%	7.8%	86.9%	34.9%	21.4%	12/87
41.3%	1.6%	95.8	6.7	6.0%	5.9%	116.4%	52.1%	13.3%	12/87
62.8%	3.1%	89.8	6.8	10.1%	7.6%	29.3%	25.3%	20.0%	9/87
92.2%	2.0%	68.0	0.8	9.0%	-18.6%	109.5%	60.0%	NA	12/87
47.8%	11.9%	198.0	18.7	26.6%	96.1%	66.2%	17.1%	44.3%	12/87
73.5%	0.0%	162.8	2.4	6.8%	-16.5%	146.5%	25.7%	NA	6/87
73.2%	5.1%	90.4	3.1	6.5%	5.3%	156.2%	29.4%	24.5%	12/87
39.8%	14.3%	81.6	3.0	3.1%	-6.7%	30.2%	6.0%	42.2%	5/87
47.8%	12.5%	81.2	-5.3	9.6%	NM	576.1%	16.8%	45.0%	9/87
52.6%	10.5%	94.5	-1.3	5.2%	NM	492.2%	22.8%	46.2%	7/87
56.8%	3.8%	306.0	34.1	NA	NA	71.4%	27.2%	26.0%	12/87
73.5%	2.7%	72.5	8.5	-3.6%	6.9%	19.2%	21.8%	7.9%	12/87
84.4%	2.7%	125.6	2.0	19.6%	79.9%	103.4%	49.3%	NA	12/87
76.5%	3.1%	48.3	1.1	-2.9%	-28.1%	103.7%	29.4%	16.2%	2/87

Source: ELECTRONIC BUSINESS

(Continued)

THE ELECTRONIC BUSINESS 200

FINANCIAL TABLES

Ranking: 51-100

Rank 1987	Rank 1986	Company	Calendar year 1987 Electronics revenue ($ millions)	Calendar year 1987 Total revenue ($ millions)	Calendar year 1987 Net income ($ millions)	Fiscal year 1987 Total revenue ($ millions)	Fiscal year 1987 Net income ($ millions)	Return on equity	Return on investment
51	53*	Grumman	$1,089.5	$3,375.3	$27.1	$3,375.3	$27.1	1.8%	1.2%
52	60	Tandem Computers	1,079.7	1,079.7	102.2	1,035.5	105.6	14.6%	14.4%
53	66	Seagate Technology	1,075.7	1,075.7	115.3	958.1	139.7	39.5%	21.3%
54	51	E-Systems	1,067.2	1,227.2	60.4	1,227.2	60.4	14.1%	11.8%
55	55	General Dynamics	1,050.0	9,344.0	437.3	9,344.0	437.3	27.3%	21.6%
56	56	Varian Associates	1,032.9	1,032.9	-4.1	982.8	21.4	4.9%	4.1%
57	71	Advanced Micro Devices	997.1	997.1	-48.1	997.1	-48.1	-7.3%	-6.0%
58	58	Prime Computer	960.9	960.9	64.8	960.9	64.8	12.9%	6.1%
59	59	Chrysler	946.0	26,276.5	1,289.7	26,276.5	1,289.7	19.8%	12.7%
60	53	Gould	933.4	933.4	25.0	933.4	25.0	5.2%	3.0%
61	68	Loral	920.0	1,244.7	69.6	690.0	57.5	15.8%	13.6%
62	61	Johnson Controls	811.0	2,806.8	96.6	2,676.8	89.6	11.6%	8.2%
63	63	Emerson Radio	792.4	792.4	-9.8	810.1	26.6	27.7%	9.0%
64	35	Eaton	775.0	3,137.9	206.2	3,137.9	206.2	19.2%	10.8%
65	93	Sun Microsystems	755.9	755.9	48.0	537.5	36.3	15.1%	9.0%
66	67	Storage Technology	750.0	750.0	19.0	750.0	19.0	8.1%	3.1%
67	70	SmithKline Beckman	704.1	4,328.8	570.1	4,328.8	570.1	36.0%	20.4%
68	73	Cray Research	687.3	687.3	147.1	687.3	147.1	24.1%	20.2%
69	54	Contel	660.0	2,905.5	77.7	2,905.5	77.7	5.4%	2.1%
70	64	General Signal	641.2	1,603.0	69.4	1,603.0	69.4	7.6%	6.8%
71	72	Intergraph	641.1	641.1	69.9	641.1	69.9	12.3%	12.2%
72	77	Monsanto	634.0	7,639.0	436.0	7,639.0	436.0	11.2%	7.3%
73	80	SCI Systems	614.7	614.7	17.0	552.9	16.0	12.0%	5.0%
74	—	Computer Associates	604.7	604.7	79.2	309.3	36.5	16.6%	11.1%
75	79	Computervision†	564.0	564.0	19.5	564.0	19.5	NA	NA
76	89	Western Digital	563.1	563.1	44.5	462.5	42.8	21.2%	20.3%
77	78	Arrow Electronics	562.4	562.4	-15.8	562.4	-15.8	-16.4%	-10.0%
78	86	Apollo Computer	553.7	553.7	21.7	553.7	21.7	9.6%	6.3%
79	85	Medtronic	537.0	608.0	83.5	502.0	73.8	19.1%	17.4%
80	74	Corning Glass Works	522.0	2,083.7	203.3	2,083.7	203.3	13.2%	10.3%
81	81	Scientific-Atlanta	513.9	513.9	28.4	495.3	24.3	12.0%	11.6%
82	115	Atari	493.2	493.2	44.2	493.2	44.2	26.3%	14.2%
83	82	United Telecommunications	476.3	2,982.2	-51.5	2,982.2	-51.5	-3.3%	-1.1%
84	88	Tyler	475.4	1,099.5	16.8	1,099.5	16.8	9.4%	5.8%
85	84	Xidex	460.0	579.7	-9.2	572.8	-44.5	-11.5%	-8.4%
86	114	Microsoft	456.7	456.7	92.9	345.9	71.9	30.1%	29.2%
87	—	Raychem	447.2	1,016.4	89.8	944.4	73.6	12.9%	10.5%
88	75	M/A-COM	437.3	437.3	-27.3	436.1	-29.3	-10.9%	-7.5%
89	—	Sprague Technologies	437.3	437.3	3.6	437.3	3.6	1.1%	1.0%
90	91	Molex	437.1	437.1	50.2	386.8	43.4	13.7%	13.3%
91	96	EG&G	420.4	1,247.5	55.5	1,247.5	55.5	20.4%	15.7%
92	83	Textron	410.0	5,388.4	261.1	5,388.4	261.1	11.3%	6.9%
93	116	LTV	396.0	7,581.8	502.6	7,581.8	502.6	-24.6%	-25.0%
94	106	Lotus Development	395.6	395.6	72.0	395.6	72.0	35.7%	30.0%
95	131	Wyse Technology	392.8	392.8	25.4	260.0	18.1	19.6%	18.2%
96	119	Emhart	392.0	2,454.5	106.5	2,454.5	106.5	12.7%	7.6%
97	95	Analog Devices	390.7	390.7	22.3	370.4	18.7	6.1%	5.6%
98	100	Teradyne	377.7	377.7	-21.5	377.7	-21.5	-7.7%	-6.5%
99	158	MiniScribe	362.5	362.5	28.1	362.5	28.1	27.8%	14.0%
100	111	Dover	360.6	1,585.5	111.7	1,585.5	111.7	16.6%	13.1%

* 1986 rank readjusted
† bought by Prime Feb. 12, 1988
NA = not available
NM = not meaningful

Fiscal year 1987				Five-year growth (Compounded average annual growth rate)					
Cost of goods as a percentage of revenue	R&D as a percentage of revenue	Revenue per employee ($ thousands)	Net income per employee ($ thousands)	Revenue	Net income	Capital outlays to net cash flow after dividends	Debt as a percentage of total capital	Foreign revenue as a percentage of total revenue	Fiscal year ended
89.4%	1.4%	$100.2	$0.8	10.4%	-21.4%	187.8%	34.2%	9.3%	12/87
29.6%	10.5%	147.8	15.1	27.1%	0.0%	90.3%	1.4%	44.4%	9/87
68.6%	3.5%	59.9	8.7	88.3%	82.5%	46.8%	46.1%	43.6%	6/87
81.4%	2.7%	79.1	3.9	11.8%	8.2%	68.3%	16.1%	6.6%	12/87
78.9%	3.6%	88.7	4.2	9.7%	20.7%	48.9%	21.1%	NA	12/87
65.0%	8.2%	82.6	1.8	8.4%	-3.0%	87.3%	16.6%	23.6%	9/87
41.1%	24.9%	55.3	-2.7	19.5%	NM	141.8%	17.7%	27.2%	12/87
38.2%	11.4%	109.0	7.3	17.1%	7.6%	69.0%	52.3%	48.0%	12/87
77.7%	3.0%	186.4	9.1	21.2%	NM	65.8%	35.8%	9.9%	12/87
49.4%	10.1%	92.2	2.5	4.0%	-17.2%	51.2%	42.2%	38.0%	12/87
73.9%	4.6%	47.6	4.0	19.6%	17.2%	45.9%	13.9%	6.2%	3/87
76.4%	1.8%	99.5	3.3	16.4%	10.7%	70.0%	29.6%	14.4%	9/87
88.1%	0.1%	1,012.6	33.3	56.0%	145.2%	14.6%	67.4%	NA	3/87
68.0%	3.7%	87.4	5.7	7.2%	NM	58.6%	43.6%	22.7%	12/87
46.1%	12.9%	128.5	8.7	474.4%	NM	124.0%	40.5%	32.0%	6/87
59.5%	8.0%	84.6	2.1	-7.0%	-21.8%	183.5%	61.7%	26.4%	12/87
31.0%	9.8%	119.2	15.7	10.4%	4.6%	29.6%	43.3%	38.1%	12/87
11.4%	15.8%	159.5	34.1	37.2%	50.6%	18.3%	16.1%	37.0%	12/87
30.2%	0.0%	133.8	3.6	8.0%	-11.3%	173.6%	60.8%	NA	12/87
61.3%	6.6%	83.8	3.6	-0.2%	-8.4%	42.1%	11.5%	20.9%	12/87
45.1%	10.5%	101.8	11.1	32.7%	40.0%	44.8%	1.0%	36.9%	12/87
53.4%	8.1%	153.6	8.8	3.8%	5.8%	55.9%	35.0%	NA	12/87
93.0%	0.0%	83.0	2.4	43.8%	31.3%	104.8%	58.3%	24.8%	6/87
-8.8%	13.0%	114.6	13.5	48.3%	65.8%	16.4%	32.8%	48.7%	3/87
NA	NA	NA	NA	11.6%	-9.7%	NA	NA	NA	12/87
59.3%	8.1%	138.5	12.8	69.2%	43.2%	66.7%	4.1%	36.9%	6/87
79.4%	0.0%	308.0	-8.7	5.8%	NM	-13.0%	39.5%	0.0%	12/87
44.5%	11.0%	138.4	5.4	98.2%	135.4%	84.3%	34.2%	51.8%	12/87
28.4%	8.4%	101.4	14.9	11.9%	8.7%	32.3%	8.8%	41.5%	4/87
60.6%	4.8%	81.7	8.0	5.7%	22.2%	76.6%	22.3%	31.3%	12/87
69.0%	4.1%	147.9	7.2	8.0%	11.4%	18.9%	3.5%	0.2%	6/87
60.8%	3.7%	120.6	10.8	19.1%	16.2%	8.4%	46.2%	45.9%	12/87
-18.9%	0.0%	127.9	-2.2	4.3%	NM	218.9%	67.1%	NA	12/87
74.8%	0.0%	146.6	2.2	11.0%	13.0%	76.5%	38.4%	NA	12/87
76.7%	2.0%	83.0	-6.5	42.6%	NM	-150.0%	26.7%	29.9%	6/87
19.2%	11.0%	190.5	39.6	69.8%	83.0%	73.0%	2.9%	42.3%	6/87
42.0%	7.3%	95.4	7.4	12.0%	14.6%	65.7%	18.8%	61.6%	6/87
69.0%	5.6%	64.6	-4.3	4.5%	NM	-295.1%	31.4%	21.5%	9/87
74.1%	4.8%	50.8	0.4	NA	NA	76.2%	5.1%	38.2%	12/87
46.2%	5.5%	77.9	8.7	18.4%	16.0%	65.2%	3.3%	68.4%	6/87
78.9%	1.4%	55.4	2.5	8.3%	6.9%	29.8%	22.9%	7.1%	12/87
78.5%	2.2%	88.3	4.3	22.1%	30.6%	65.3%	39.2%	27.5%	12/87
81.7%	0.0%	157.3	10.4	9.7%	26.5%	45.7%	-1.5%	NA	12/87
13.4%	14.8%	188.4	34.3	356.3%	NM	30.3%	15.7%	52.3%	12/87
66.4%	5.3%	128.7	9.0	102.7%	NM	36.8%	7.5%	0.2%	3/87
64.5%	1.6%	8.0	3.5	7.5%	5.8%	64.7%	40.2%	40.9%	12/87
37.3%	15.1%	71.2	3.6	16.3%	13.6%	82.1%	8.3%	0.5%	10/87
50.2%	16.3%	80.4	-4.6	12.8%	NM	374.1%	15.9%	36.4%	12/87
71.3%	5.5%	72.9	5.7	135.5%	NM	128.2%	49.6%	36.1%	12/87
65.2%	2.9%	90.1	6.3	8.9%	4.5%	28.8%	21.1%	24.0%	12/87

Source: ELECTRONIC BUSINESS

(Continued)

THE ELECTRONIC BUSINESS 200

FINANCIAL TABLES

Ranking: 101-150

Rank 1987	Rank 1986	Company	Calendar year 1987 Electronics revenue ($ millions)	Calendar year 1987 Total revenue ($ millions)	Calendar year 1987 Net income ($ millions)	Fiscal year 1987 Total revenue ($ millions)	Fiscal year 1987 Net income ($ millions)	Return on equity	Return on investment
101	94	Diebold	$360.0	$439.1	$35.8	$439.1	$35.8	10.5%	10.3%
102	105	Dynatech	348.9	348.9	21.4	304.7	23.2	18.8%	13.9%
103	99	AM International	342.0	1,199.0	1.6	1,162.8	2.3	0.9%	0.4%
104	120	Nashua	341.0	865.1	26.6	865.1	26.6	12.8%	9.5%
105	109	Marshall Industries	340.3	340.3	10.6	286.6	5.1	9.4%	5.1%
106	—	MAI Basic Four	334.3	334.3	23.8	321.0	22.8	29.3%	17.6%
107	90	Dataproducts	334.2	334.2	-3.6	338.8	9.0	4.1%	3.3%
108	126	Polaroid	330.0	1,763.9	116.1	1,763.9	116.1	10.8%	8.9%
109	65	Penn Central	325.0	1,421.4	34.8	1,421.4	34.8	2.1%	1.9%
110	98	Datapoint	320.7	320.7	15.1	312.1	-58.5	-32.2%	-20.1%
111	113	Augat	313.2	313.2	11.5	313.2	11.5	5.4%	4.8%
112	102	DSC Communications	312.4	312.4	14.6	312.4	14.6	6.9%	5.1%
113	180	Mark IV Industries	311.2	394.9	16.2	291.5	10.2	25.3%	3.9%
114	97	Cubic	311.0	357.8	7.7	361.8	7.9	7.1%	4.1%
115	123	Eli Lilly	308.0	3,643.8	410.5	3,643.8	410.5	13.5%	11.3%
116	174	Genicom	302.2	302.2	12.6	302.2	12.6	21.5%	7.5%
117	110	Premier Industrial	296.0	486.8	56.0	459.0	48.3	18.1%	17.6%
118	—	Westmark International	291.9	291.9	-7.2	291.9	-7.2	-3.2%	-3.1%
119	168	AST Research	289.8	289.8	3	206.0	13.0	13.1%	13.1%
120	127	Tandon	289.1	289.1	17.1	289.1	17.1	18.3%	15.2%
121	138	Micropolis	288.3	288.3	27.2	288.3	27.2	19.6%	12.7%
122	148	Bolt Beranek and Newman	279.8	279.8	-6.1	233.8	-8.0	-9.4%	-8.7%
123	149	AVX	271.9	271.9	15.8	271.9	15.8	8.5%	4.8%
124	121	Square D	270.5	1,484.2	110.0	1,484.2	110.0	16.2%	12.4%
125	103	TIE/communications	270.2	270.2	-11.1	250.2	-11.1	-6.4%	-5.1%
126	124	Recognition Equipment	269.2	269.2	10.1	264.7	11.2	8.4%	5.6%
127	136	Diasonics	267.6	267.6	15.2	267.6	15.2	14.4%	12.1%
128	104	Foxboro	267.3	504.4	-96.9	504.4	-96.9	-51.5%	-40.1%
129	141	Ashton-Tate	267.3	267.3	43.1	267.3	43.1	24.1%	23.0%
130	108	Savin	267.2	356.3	115.0	356.3	0.1	-0.2%	0.1%
131	129	Figgie International	266.0	1,022.7	49.3	1,022.7	49.3	15.3%	11.0%
132	134	Wyle Laboratories	265.4	368.0	5.8	368.0	5.8	6.5%	4.3%
133	118	Watkins-Johnson	264.3	264.3	17.1	264.3	17.1	14.7%	12.0%
134	151	LSI Logic	262.1	262.1	10.7	262.1	10.7	3.5%	2.2%
135	125	CTS	261.1	261.1	10.5	261.1	10.5	8.3%	6.3%
136	107	Kollmorgen	260.0	301.0	0.3	301.0	0.3	0.4%	0.2%
137	117	Bally Manufacturing	255.0	1,730.1	-6.4	1,730.1	-6.4	-1.1%	-0.3%
138	139	Gerber Scientific	254.8	254.8	28.0	223.9	21.1	13.1%	11.7%
139	133	Cooper Industries	251.0	3,585.8	173.8	3,585.8	173.8	10.9%	6.8%
140	153	Bell Industries	250.0	407.1	4.5	357.1	3.3	3.1%	2.4%
141	157	Ball	242.2	1,054.1	66.3	1,054.1	66.3	16.7%	12.2%
142	184	Maxtor	239.4	239.4	16.1	175.3	22.4	22.0%	10.7%
143	137	Pioneer-Standard	238.5	238.5	4.1	212.2	1.8	6.3%	2.2%
144	194	Applied Magnetics	235.7	235.7	17.5	211.9	14.2	9.5%	9.2%
145	132	Reynolds & Reynolds	234.0	572.1	19.5	562.7	21.2	11.0%	7.1%
146	112	Paradyne	232.6	232.6	-2.6	232.6	-2.6	-1.8%	-1.1%
147	147	Andrew	229.0	229.0	4.2	223.2	3.8	2.5%	2.2%
148	135	Sundstrand	228.0	1,365.5	34.6	1,365.5	34.6	5.8%	3.7%
149	152	Measurex	227.4	227.4	26.8	227.4	26.8	15.8%	15.2%
150	130	BRIntec	222.2	293.7	5.9	293.7	5.9	10.0%	4.0%

NA = not available NM = not meaningful

Fiscal year 1987				Five-year growth (Compounded average annual growth rate)					
Cost of goods as a percentage of revenue	R&D as a percentage of revenue	Revenue per employee ($ thousands)	Net income per employee ($ thousands)	Revenue	Net income	Capital outlays to net cash flow after dividends	Debt as a percentage of total capital	Foreign revenue as a percentage of total revenue	Fiscal year ended
64.6%	3.3%	$90.0	$7.3	0.5%	-2.9%	29.7%	2.0%	7.0%	12/87
40.8%	9.0%	98.3	7.5	23.7%	30.2%	37.3%	26.3%	25.4%	3/87
63.8%	4.2%	97.3	0.2	14.1%	NM	92.9%	54.8%	38.0%	7/87
64.9%	0.8%	128.8	4.0	7.7%	NM	67.0%	26.0%	0.5%	12/87
75.1%	0.0%	260.6	4.7	19.4%	NM	143.7%	45.7%	NA	5/87
44.6%	4.0%	98.7	7.0	5.1%	NM	47.6%	39.9%	64.1%	9/87
64.5%	6.6%	86.9	2.3	3.2%	13.8%	60.2%	19.3%	26.8%	3/87
49.9%	8.1%	129.1	8.5	6.4%	37.6%	75.4%	17.2%	42.8%	12/87
80.2%	0.7%	90.5	2.2	-14.8%	-23.3%	41.7%	10.7%	17.6%	12/87
57.8%	6.2%	113.5	-21.3	-9.3%	NM	-74.1%	37.4%	79.2%	7/87
68.1%	5.1%	82.4	3.0	8.8%	-11.2%	136.0%	11.5%	18.0%	12/87
49.6%	13.1%	122.8	5.7	35.5%	16.8%	53.5%	26.8%	14.4%	12/87
62.8%	2.2%	58.3	2.0	67.5%	70.9%	31.2%	84.7%	10.6%	2/87
73.4%	1.4%	80.4	1.8	4.3%	-13.3%	118.8%	41.9%	NA	9/87
30.7%	12.8%	141.8	16.0	4.2%	-0.1%	108.8%	16.6%	35.9%	12/87
64.8%	4.9%	84.2	3.5	NA	NA	37.8%	65.1%	32.0%	12/87
51.5%	0.6%	120.8	12.7	6.7%	6.9%	10.7%	2.5%	0.0%	5/87
55.6%	9.6%	96.6	-2.4	NA	NA	366.7%	2.7%	28.0%	12/87
56.1%	5.4%	151.7	9.6	249.5%	NM	35.0%	0.0%	19.6%	6/87
70.4%	3.6%	82.4	4.9	13.9%	1.7%	52.2%	16.8%	75.0%	12/87
72.7%	7.5%	120.9	11.4	54.3%	206.9%	52.0%	35.0%	69.7%	12/87
52.8%	6.1%	87.6	-3.0	27.6%	NM	489.1%	7.5%	NA	6/87
66.0%	3.1%	36.3	2.1	17.7%	38.8%	91.9%	43.9%	43.0%	12/87
60.8%	3.0%	75.0	5.6	7.9%	8.9%	37.3%	23.4%	19.0%	12/87
66.7%	8.6%	166.8	-7.4	7.8%	NM	-187.6%	20.3%	30.3%	12/87
53.5%	4.4%	90.7	3.8	18.7%	NM	96.6%	33.1%	49.1%	10/87
58.4%	6.9%	177.2	10.1	19.5%	10.8%	33.8%	16.4%	3.1%	12/87
60.7%	10.0%	72.1	-13.8	-3.5%	NM	-45.2%	22.1%	52.8%	12/87
11.6%	10.5%	213.9	34.5	60.8%	74.0%	11.2%	4.2%	30.3%	1/88
57.8%	1.3%	176.4	0.1	-4.2%	NM	4.5%	159.7%	10.8%	12/87
72.8%	1.3%	62.4	3.0	8.7%	14.1%	42.8%	27.9%	NA	12/87
76.7%	0.0%	169.5	2.7	13.4%	NM	49.1%	33.5%	NA	1/88
58.7%	6.4%	84.4	5.5	11.1%	10.7%	47.0%	18.2%	19.0%	12/87
48.7%	11.0%	113.0	4.6	120.8%	NM	339.5%	38.3%	14.6%	12/87
75.5%	2.0%	39.3	1.6	4.7%	3.8%	63.7%	24.3%	19.7%	12/87
66.9%	4.7%	77.2	0.1	4.4%	-50.6%	124.2%	45.6%	11.4%	12/87
61.6%	0.9%	58.8	-0.2	6.1%	NM	168.1%	71.2%	NA	12/87
46.8%	7.4%	124.4	11.7	14.2%	44.0%	41.4%	10.3%	47.0%	4/87
64.0%	0.0%	83.0	4.0	8.4%	5.2%	44.6%	37.3%	20.6%	12/87
75.0%	0.0%	155.3	1.4	11.8%	-15.3%	87.4%	23.0%	NA	6/87
77.1%	1.3%	152.8	9.6	3.4%	13.9%	153.5%	27.1%	NA	12/87
[illegible]%	6.7%	90.9	11.6	NA	NA	66.1%	51.6%	16.0%	3/87
75.3%	0.0%	253.6	2.2	17.5%	-4.4%	61.5%	65.0%	NA	3/87
64.9%	9.2%	30.5	2.0	18.0%	9.8%	98.8%	3.2%	46.5%	9/87
54.2%	2.2%	98.7	3.7	20.6%	22.1%	98.0%	35.4%	6.8%	9/87
53.0%	8.2%	74.7	-0.8	2.3%	NM	52.0%	37.0%	17.9%	12/87
63.1%	4.7%	97.0	1.7	9.4%	-23.3%	70.3%	13.8%	40.7%	9/87
60.4%	5.2%	96.2	2.4	7.3%	-13.0%	78.4%	36.5%	22.2%	12/87
52.9%	7.3%	89.5	10.6	14.0%	NM	22.1%	3.5%	59.4%	11/87
76.1%	1.5%	75.1	1.5	4.0%	NM	73.5%	60.3%	15.8%	12/87

Source: ELECTRONIC BUSINESS

(Continued)

THE ELECTRONIC BUSINESS 200

FINANCIAL TABLES

Ranking: 151-200

Rank 1987	Rank 1986	Company	Calendar year 1987 Electronics revenue ($ millions)	Calendar year 1987 Total revenue ($ millions)	Calendar year 1987 Net income ($ millions)	Fiscal year 1987 Total revenue ($ millions)	Fiscal year 1987 Net income ($ millions)	Return on equity	Return on investment
151	164	Mentor Graphics	$221.8	$221.8	$20.3	$221.8	$20.3	10.8%	10.5%
152	144	Avantek	213.7	213.7	11.6	213.7	11.6	7.5%	7.5%
153	—	Cullinet Software	213.4	213.4	-30.6	174.9	-27.6	-23.2%	-20.3%
154	154	Micom Systems	211.5	211.5	9.3	196.7	12.2	7.1%	6.8%
155	145	Logicon	211.4	211.4	6.5	204.8	6.1	10.5%	10.5%
156	166	Veeco Instruments	211.1	211.1	9.8	195.6	9.2	9.2%	6.2%
157	143	Fluke	206.7	206.7	2.3	206.3	2.0	1.9%	1.7%
158	178	Applied Materials	202.3	202.3	7.5	174.4	0.3	0.2%	0.2%
159	172	Ultimate	201.1	201.1	17.4	172.9	13.8	15.5%	14.5%
160	176	Digital Communications	200.6	200.6	34.2	181.4	27.0	17.2%	17.2%
161	128	Cincinnati Milacron	200.0	828.0	-80.0	828.0	-80.0	-37.2%	-19.4%
162	198	Anthem Electronics	196.9	196.9	5.0	196.9	5.0	7.3%	6.7%
163	—	Imo Delaval	196.7	368.5	20.1	368.5	18.7	9.0%	4.0%
164	155	Bell & Howell	195.0	726.9	21.0	726.9	21.0	7.7%	4.6%
165	146	GenRad	193.8	193.8	2.1	193.8	2.1	2.9%	1.4%
166	156	General DataComm	192.6	192.6	-8.3	200.6	0.8	0.9%	0.7%
167	179	Esterline	192.0	270.4	-28.0	259.7	-29.3	-39.1%	-21.6%
168	183	Dynascan	191.6	191.6	6.6	191.6	6.6	14.5%	9.1%
169	150	Decision Industries [2]	191.4	191.4	-23.3	191.4	-20.4	-28.0%	-27.8%
170	199	Olin	190.0	1,930.0	78.0	1,930.0	78.0	11.1%	6.8%
171	—	Combustion Engineering	189.8	3,042.1	56.6	3,042.1	56.6	6.6%	4.6%
172	—	Oracle Systems	186.9	186.9	23.3	131.3	15.6	18.9%	16.1%
173	167	Ametek	185.0	620.1	41.2	620.1	41.2	16.3%	9.9%
174	—	Stratus Computer	184.2	184.2	19.4	184.2	19.4	18.9%	17.6%
175	169	Sun Electric [3]	181.6	181.6	2.6	203.9	3.3	4.1%	2.5%
176	173	ISC Systems	179.4	179.4	8.1	168.5	6.5	6.5%	5.4%
177	—	Quantum	178.3	178.3	8.1	120.8	8.8	8.1%	8.1%
178	186	ADC Telecommunications	177.7	177.7	17.4	166.9	15.3	20.1%	19.3%
179	189	Burndy	176.0	283.9	11.6	283.9	11.6	7.2%	5.3%
180	200	Thomas & Betts	175.0	436.5	48.5	436.5	48.5	16.8%	14.6%
181	—	Inmac	174.5	174.5	7.3	165.4	7.7	22.9%	20.0%
182	—	Oak Industries	173.1	182.2	5.7	182.2	5.7	7.2%	4.8%
183	160	Cipher Data Products	172.9	172.9	5.2	178.2	4.3	3.1%	3.1%
184	—	VLSI Technology	172.0	172.0	8.1	172.0	8.1	5.7%	3.9%
185	193	Coherent	171.5	171.5	0.7	159.0	-1.1	-1.3%	-1.0%
186	—	3Com	171.1	171.1	15.0	110.4	11.1	14.6%	14.5%
187	159	NBI	170.0	261.5	-17.9	278.3	5.9	6.5%	3.7%
188	192	Altos Computer Systems	168.3	168.3	14.4	153.9	9.7	9.1%	7.4%
189	187	Intelligent Systems	163.2	163.2	10.2	163.2	10.2	24.7%	16.4%
190	—	Cherry Electrical Products	160.7	187.4	5.6	160.6	2.7	4.4%	2.8%
191	—	Gencorp	158.6	1,619.0	18.0	1,619.0	18.0	-9.3%	5.8%
192	171	Tyco Laboratories	156.0	1,252.1	51.3	1,062.9	44.1	18.7%	11.7%
193	195	United Industrial	155.0	297.5	14.3	297.5	14.3	14.7%	9.8%
194	—	Brush Wellman	153.8	307.6	26.2	307.6	26.2	10.8%	8.9%
195	—	Insilco	153.2	639.7	33.9	639.7	33.9	11.3%	6.9%
196	190	Pittway	152.0	649.1	32.4	649.1	32.4	10.4%	8.5%
197	177	International Rectifier	151.0	151.0	-23.6	151.8	-17.2	-42.2%	-13.4%
198	—	LTX	149.6	149.6	1.6	120.6	-6.7	-12.7%	-9.9%
199	196	Aydin	149.2	149.2	14.8	149.2	8.8	12.6%	11.1%
200	—	Computer Consoles	148.4	148.4	9.6	148.4	9.6	29.9%	8.1%

[1] went private April 29, 1988

[2] calendar year 1987 includes only 11 months from Feb. to Dec. Changed fiscal year from Oct. to Dec.

NA = not available

NM = not meaningful

Cost of goods as a percentage of revenue	Fiscal year 1987: R&D as a percentage of revenue	Fiscal year 1987: Revenue per employee ($ thousands)	Fiscal year 1987: Net income per employee ($ thousands)	Five-year growth (Compounded average annual growth rate): Revenue	Five-year growth (Compounded average annual growth rate): Net income	Capital outlays to net cash flow after dividends	Debt as a percentage of total capital	Foreign revenue as a percentage of total revenue	Fiscal year ended
43.0%	10.9%	$184.9	$16.9	164.1%	NM	43.2%	3.0%	45.9%	12/87
55.9%	12.3%	70.3	3.8	20.6%	4.3%	97.7%	0.0%	13.0%	12/87
87.8%	28.5%	72.6	-11.5	28.8%	NM	-124.9%	12.3%	26.4%	4/87
44.9%	11.3%	96.3	6.0	27.8%	8.8%	45.7%	4.2%	10.0%	3/87
83.1%	0.8%	81.9	2.4	18.9%	14.4%	52.0%	0.0%	NA	3/87
54.3%	6.2%	67.4	3.2	11.3%	1.6%	68.6%	32.2%	46.1%	9/87
41.6%	10.8%	86.0	0.8	25.9%	-15.7%	66.9%	9.7%	40.5%	9/87
53.8%	17.9%	124.1	0.2	13.9%	NM	119.6%	14.4%	43.9%	10/87
49.7%	2.6%	384.1	30.6	42.1%	36.6%	37.8%	6.0%	23.4%	4/87
28.3%	11.6%	153.0	22.8	66.4%	107.7%	57.4%	0.0%	19.0%	6/87
74.9%	4.3%	89.5	-8.6	1.7%	NM	-23.3%	47.9%	19.8%	12/87
76.7%	0.0%	447.5	11.4	38.5%	27.3%	15.0%	7.5%	NA	12/87
64.4%	2.0%	56.7	2.9	NA	NA	34.8%	55.4%	29.0%	12/87
59.8%	5.0%	81.3	2.4	3.5%	2.6%	86.9%	39.7%	31.1%	12/87
39.2%	13.6%	91.7	1.0	0.6%	-25.1%	66.0%	50.4%	40.4%	12/87
50.6%	12.6%	76.0	0.3	27.0%	NM	134.9%	21.2%	21.9%	9/87
63.5%	4.7%	82.3	-9.3	6.0%	NM	-14.5%	44.6%	39.1%	10/87
73.4%	0.8%	496.3	17.1	18.2%	14.2%	22.1%	37.2%	2.1%	12/87
74.7%	5.7%	123.9	-13.2	20.9%	NM	-31.9%	0.4%	5.5%	11/87
69.3%	3.2%	136.9	5.5	4.2%	14.9%	72.3%	38.7%	12.6%	12/87
82.0%	1.7%	110.3	2.1	5.1%	-10.5%	74.3%	30.1%	33.1%	12/87
61.7%	6.0%	117.1	13.9	NA	NA	80.6%	14.7%	46.8%	5/87
71.0%	3.7%	88.6	5.9	7.9%	8.6%	72.7%	39.1%	NA	12/87
31.7%	10.3%	150.4	15.8	101.8%	NM	49.6%	7.3%	29.2%	12/87
53.2%	2.4%	83.5	1.3	5.5%	NM	55.5%	37.2%	30.0%	10/87
54.4%	8.4%	94.3	3.7	22.1%	-4.2%	68.4%	17.0%	NA	6/87
61.4%	9.5%	173.5	12.7	54.6%	116.3%	42.6%	0.0%	21.0%	3/87
47.8%	9.3%	92.9	8.5	21.8%	26.9%	47.5%	4.3%	12.4%	10/87
60.6%	4.4%	69.9	2.9	4.6%	-5.4%	61.5%	25.4%	44.3%	12/87
45.8%	4.3%	103.9	11.5	9.6%	15.4%	96.8%	13.3%	41.5%	12/87
62.8%	0.0%	258.5	12.1	NA	NA	28.9%	12.9%	59.2%	7/87
77.7%	2.2%	47.4	1.5	-9.6%	NM	47.7%	34.1%	14.4%	12/87
67.9%	11.3%	94.7	2.3	25.0%	12.5%	55.5%	1.8%	18.4%	6/87
42.5%	17.8%	127.9	6.0	-23.5%	-20.2%	152.1%	32.5%	22.1%	12/87
58.8%	11.3%	98.3	-0.7	14.6%	9.5%	222.4%	20.8%	46.4%	9/87
46.2%	8.4%	200.0	20.2	NA	NA	43.7%	0.4%	24.0%	5/87
50.1%	3.5%	88.5	1.9	22.7%	-11.6%	31.3%	43.5%	NA	6/87
55.9%	9.0%	196.8	12.4	24.7%	11.1%	199.8%	19.3%	42.0%	6/87
61.6%	4.0%	333.1	20.8	46.0%	26.0%	17.1%	33.6%	26.6%	12/87
66.4%	6.0%	55.7	0.9	12.3%	-8.5%	114.5%	36.8%	49.4%	2/87
77.2%	2.2%	114.8	1.3	NA	NA	200.0%	162.6%	NA	11/87
74.9%	0.5%	100.3	4.2	0.1%	13.7%	68.0%	37.3%	8.8%	5/87
74.7%	0.0%	63.8	3.1	8.5%	4.4%	63.6%	33.0%	NA	12/87
63.5%	2.1%	120.0	10.2	14.4%	8.1%	58.3%	17.9%	26.2%	12/87
64.2%	0.6%	86.5	4.6	0.1%	5.7%	95.1%	38.6%	NA	12/87
59.1%	2.5%	81.1	4.0	9.8%	3.2%	77.2%	18.7%	19.4%	12/87
75.4%	5.3%	64.5	-7.3	11.9%	NM	-61.8%	68.2%	50.1%	6/87
45.8%	19.2%	103.7	-5.8	20.7%	NM	283.6%	21.6%	51.0%	7/87
65.1%	6.7%	74.6	4.4	3.7%	-3.1%	31.0%	12.6%	17.8%	12/87
33.9%	14.0%	114.9	7.4	13.4%	5.4%	22.1%	72.8%	21.4%	12/87

Source: ELECTRONIC BUSINESS

(Continued)

THE ELECTRONIC BUSINESS 200

ALPHABETICAL INDEX

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Amdahl Corp.	41
Ametek Inc.	173
Analog Devices Inc.	97
Andrew Corp.	147
Anthem Electronics Inc.	162
Apollo Computer Inc.	78
Apple Computer Inc.	22
Applied Magnetics Corp.	144
Applied Materials Inc.	158
Arrow Electronics Inc.	77
Ashton-Tate Corp.	129
Atari Corp.	82
Augat Inc.	111
Avantek Inc.	152
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Aydin Corp.	199
Ball Corp.	141
Bally Manufacturing Corp.	137
Bell & Howell Co.	164
Bell Industries Inc.	140
Boeing Co., The	33
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Burndy Corp.	179
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Cherry Electrical Products Corp.	190
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Cincinnati Milacron Inc.	161
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Coherent Inc.	185
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Compaq Computer Corp.	47
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Digital Equipment Corp.	4
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Oak Industries Inc.	182
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The Electronic Business 200

INDUSTRY SEGMENTS

Fiscal 1987 figures Company	Revenue per employee ($ thousands)	Profit as a percentage of revenue	Return on investment	Cost of goods sold as a percentage of revenue	R&D as a percentage of revenue	Capital expenditures as a percentage of revenue	Foreign revenue as a percentage of revenue	200 rank
COMMUNICATIONS								
Dynascan	$496.3	3.4%	9.1%	73.4%	0.8%	0.9%	2.1%	168
3Com	200.0	10.1%	14.5%	46.2%	8.4%	5.7%	24.0%	186
TIE/communications	166.8	-4.4%	-5.1%	66.7%	8.6%	1.7%	30.3%	125
Digital Communications	153.0	14.9%	17.2%	28.3%	11.6%	10.5%	19.0%	160
Scientific-Atlanta	147.9	4.9%	11.6%	69.0%	4.1%	1.4%	15.0%	81
DSC Communications	122.8	4.7%	5.1%	49.6%	13.1%	7.4%	14.4%	112
Dynatech	98.3	7.6%	13.9%	40.8%	9.0%	4.1%	25.4%	102
Andrew	97.0	1.7%	2.2%	63.1%	4.7%	5.2%	40.7%	147
Micom Systems	96.3	6.2%	6.8%	44.9%	11.3%	4.6%	10.0%	154
ADC Telecommunications	92.9	9.1%	19.3%	47.8%	9.3%	6.7%	12.4%	178
Bolt Beranek and Newman	87.6	-3.4%	-8.7%	52.8%	6.1%	9.5%	0.0%	122
General DataComm Industries	76.0	0.4%	0.7%	50.6%	12.6%	7.6%	21.9%	166
Paradyne	74.7	-1.1%	-1.1%	53.0%	8.2%	5.2%	17.9%	146
Aydin	74.6	5.9%	11.1%	65.1%	6.7%	2.8%	17.8%	199
Avantek	70.3	5.4%	7.5%	55.9%	12.3%	11.4%	13.0%	152
Motorola	68.6	4.6%	8.3%	53.2%	7.8%	9.8%	43.8%	9
M/A-COM	64.6	-6.7%	-7.5%	69.0%	5.6%	6.1%	21.5%	88
General Instrument	48.3	2.3%	2.8%	76.5%	3.1%	8.0%	16.2%	50
Weighted average	**$74.5**	**3.8%**	**6.1%**	**55.9%**	**7.5%**	**8.2%**	**33.1%**	
GOVERNMENT								
GM Hughes Electronics	$104.8	5.0%	6.7%	72.3%	4.0%	4.5%	11.6%	3
Gould	92.2	2.7%	3.0%	49.4%	10.1%	5.2%	38.0%	60
Harris	85.6	4.1%	7.4%	58.8%	5.7%	4.0%	14.7%	30
Honeywell	84.7	3.8%	7.0%	66.8%	4.3%	4.6%	20.6%	10
Watkins-Johnson	84.4	6.5%	12.0%	58.7%	6.4%	4.7%	19.0%	133
SCI Systems	83.0	2.9%	5.0%	93.0%	0.0%	5.4%	24.8%	73
Varian Associates	82.6	2.2%	4.1%	65.0%	8.2%	4.7%	23.6%	56
Logicon	81.9	3.0%	10.5%	83.1%	0.8%	1.9%	0.0%	155
Litton Industries	81.5	3.1%	10.8%	76.1%	4.7%	5.5%	22.7%	20
Cubic	80.4	2.2%	4.1%	73.4%	1.4%	4.7%	0.0%	114
E-Systems	79.1	4.9%	11.8%	81.4%	2.7%	4.2%	6.6%	54
Aydin	74.6	5.9%	11.1%	65.1%	6.7%	2.8%	17.8%	199
Texas Instruments	71.7	4.6%	9.2%	71.5%	7.7%	8.3%	31.5%	12
Motorola	68.6	4.6%	8.3%	53.2%	7.8%	9.8%	43.8%	9
Singer	68.0	1.2%	1.5%	92.2%	2.0%	4.1%	0.0%	40
Loral	47.6	8.3%	13.6%	73.9%	4.6%	5.0%	6.2%	61
Weighted average	**$81.3**	**4.2%**	**7.2%**	**68.8%**	**5.3%**	**5.9%**	**22.0%**	
DISTRIBUTORS								
Anthem Electronics	$447.5	2.5%	6.7%	76.7%	0.0%	0.5%	0.0%	162
Arrow Electronics	308.0	-2.8%	-10.0%	79.4%	0.0%	0.4%	0.0%	77
Marshall Industries	260.6	1.8%	5.1%	75.1%	0.0%	3.2%	0.0%	105
Pioneer-Standard Electronics	253.6	0.9%	2.2%	75.3%	0.0%	1.1%	0.0%	143
Wyle Laboratories	169.5	1.6%	4.3%	76.7%	0.0%	1.0%	0.0%	132
Avnet	162.8	1.5%	2.6%	73.5%	0.0%	3.1%	0.0%	42
Weighted average	**$199.9**	**0.8%**	**1.7%**	**75.4%**	**0.0%**	**2.1%**	**0.0%**	

For purposes of comparison, only companies whose electronics revenue constitutes over 70% of total revenue are included

THE ELECTRONIC BUSINESS 200

INDUSTRY SEGMENTS

Fiscal 1987 figures Company	Revenue per employee ($ thousands)	Profit as a percentage of revenue	Return on investment	Cost of goods sold as a percentage of revenue	R&D as a percentage of revenue	Capital expenditures as a percentage of revenue	Foreign revenue as a percentage of revenue	200 rank
CAPITAL EQUIPMENT								
Gerber Scientific	$124.4	9.4%	11.7%	46.8%	7.4%	4.7%	47.0%	138
Applied Materials	124.1	0.2%	0.2%	53.8%	17.9%	6.6%	43.9%	158
LTX	103.7	-5.6%	-9.9%	45.8%	19.2%	11.3%	51.0%	198
Hewlett-Packard	98.7	8.0%	10.6%	42.6%	11.1%	6.3%	49.0%	8
Perkin-Elmer	94.5	-1.4%	-2.0%	52.6%	10.5%	5.0%	46.2%	46
GenRad	91.7	1.1%	1.4%	39.2%	13.6%	6.0%	40.4%	165
John Fluke	86.0	1.0%	1.7%	41.6%	10.8%	4.0%	40.5%	157
Sun Electric	83.5	1.6%	2.5%	53.2%	2.4%	2.3%	30.0%	175
Varian Associates	82.6	2.2%	4.1%	65.0%	8.2%	4.7%	23.6%	56
Esterline	82.3	-11.3%	-21.6%	63.5%	4.7%	1.0%	39.1%	167
Tektronix	81.6	3.7%	5.7%	39.8%	14.3%	2.9%	42.2%	44
Teradyne	80.4	-5.7%	-6.5%	50.2%	16.3%	10.8%	36.4%	98
Weighted average	**$94.0**	**4.9%**	**6.9%**	**45.8%**	**11.2%**	**5.6%**	**45.1%**	
OFFICE EQUIPMENT								
Savin	$176.4	0.0%	0.1%	57.8%	1.3%	0.3%	10.8%	130
IBM	139.3	9.7%	12.0%	38.9%	10.0%	7.9%	54.0%	1
Datapoint	113.5	-18.7%	-20.1%	57.8%	6.2%	8.2%	79.2%	110
Xerox	104.2	5.6%	7.5%	45.1%	7.0%	9.1%	44.9%	7
Wang Laboratories	93.6	2.5%	3.1%	27.1%	7.5%	4.5%	40.1%	21
NCR	91.0	7.4%	17.7%	48.8%	6.3%	6.9%	54.6%	11
Diebold	90.0	8.1%	10.3%	64.6%	3.3%	1.9%	7.0%	101
Harris	85.6	4.1%	7.4%	58.8%	5.7%	4.0%	14.7%	30
Pitney Bowes	76.4	8.9%	13.5%	31.7%	2.9%	11.2%	19.5%	31
Weighted average	**$121.8**	**8.4%**	**11.1%**	**40.6%**	**8.9%**	**7.8%**	**50.0%**	
COMPUTER-BASED SYSTEMS								
Gerber Scientific	$124.4	9.4%	11.7%	46.8%	7.4%	4.7%	47.0%	138
Intergraph	101.8	10.9%	12.2%	45.1%	10.5%	6.8%	36.9%	71
Hewlett-Packard	98.7	8.0%	10.6%	42.6%	11.1%	6.3%	49.0%	8
Coherent	98.3	-0.7%	-1.0%	58.8%	11.3%	5.3%	46.4%	185
ISC Systems	94.3	3.9%	5.4%	54.4%	8.4%	5.2%	0.0%	176
Recognition Equipment	90.7	4.2%	5.6%	53.5%	4.4%	8.2%	49.1%	126
Measurex	89.5	11.8%	15.2%	52.9%	7.3%	3.0%	59.4%	149
Honeywell	84.7	3.8%	7.0%	66.8%	4.3%	4.6%	20.6%	10
Sun Electric	83.5	1.6%	2.5%	53.2%	2.4%	2.3%	30.0%	175
Weighted average	**$92.4**	**6.2%**	**9.2%**	**53.1%**	**8.0%**	**5.5%**	**36.5%**	
MEDICAL								
Diasonics	$177.2	5.7%	12.1%	58.4%	6.9%	3.0%	3.1%	127
Medtronic	101.4	14.7%	17.4%	28.4%	8.4%	5.7%	41.5%	79
Westmark International	96.6	-2.5%	-3.1%	55.6%	9.6%	3.6%	28.0%	118
Weighted average	**$111.9**	**7.7%**	**10.4%**	**43.5%**	**8.3%**	**4.4%**	**28.1%**	

For purposes of comparison, only companies whose electronics revenue constitutes over 70% of total revenue are included

THE ELECTRONIC BUSINESS 200

INDUSTRY SEGMENTS

Fiscal 1987 figures Company	Revenue per employee ($ thousands)	Profit as a percentage of revenue	Return on investment	Cost of goods sold as a percentage of revenue	R&D as a percentage of revenue	Capital expenditures as a percentage of revenue	Foreign revenue as a percentage of revenue	200 rank
SEMICONDUCTORS								
Western Digital	$138.5	9.3%	20.3%	59.3%	8.1%	8.8%	36.9%	76
VLSI Technology	127.9	4.7%	3.9%	42.5%	17.8%	29.1%	22.1%	184
LSI Logic	113.0	4.1%	2.2%	48.7%	11.0%	66.6%	14.6%	134
Intel	99.3	9.2%	8.5%	45.7%	13.6%	15.8%	38.8%	35
Gould	92.2	2.7%	3.0%	49.4%	10.1%	5.2%	38.0%	60
Harris	85.6	4.1%	7.4%	58.8%	5.7%	4.0%	14.7%	30
Texas Instruments	71.7	4.6%	9.2%	71.5%	7.7%	8.3%	31.5%	12
Analog Devices	71.2	5.0%	5.6%	37.3%	15.1%	11.6%	46.4%	97
Motorola	68.6	4.6%	8.3%	53.2%	7.8%	9.8%	43.8%	9
International Rectifier	64.5	-11.3%	-13.4%	75.4%	5.3%	4.0%	50.1%	197
National Semiconductor	64.0	-1.5%	-2.9%	62.1%	11.7%	5.1%	42.1%	36
Advanced Micro Devices	55.3	-4.8%	-6.0%	41.1%	24.9%	13.8%	27.2%	57
Weighted average	**$73.9**	**3.9%**	**6.1%**	**57.8%**	**9.5%**	**9.8%**	**35.6%**	
COMPONENTS (other than semiconductors)								
AMP	$105.4	10.8%	6.3%	56.8%	8.8%	7.4%	52.3%	34
Augat	82.4	3.7%	4.8%	68.1%	5.1%	9.4%	18.0%	111
Molex	77.9	11.2%	13.3%	46.2%	5.5%	12.8%	68.4%	90
BRIntec	75.1	2.0%	4.0%	76.1%	1.5%	3.2%	15.8%	150
Cherry Electrical Products	55.7	1.7%	2.8%	66.4%	6.0%	9.6%	49.4%	190
Sprague Technologies	50.8	0.8%	1.0%	74.1%	4.8%	5.6%	38.2%	89
Oak Industries	47.4	3.1%	4.8%	77.7%	2.2%	3.4%	14.4%	182
CTS	39.3	4.0%	6.3%	75.5%	2.0%	5.1%	19.7%	135
AVX	36.3	5.8%	4.8%	66.0%	3.1%	11.7%	43.0%	123
Weighted average	**$72.1**	**7.5%**	**10.5%**	**62.3%**	**5.4%**	**7.6%**	**43.7%**	
PERIPHERALS								
Intelligent Systems	$333.1	6.2%	16.4%	61.6%	4.0%	1.7%	26.6%	189
Quantum	173.5	7.3%	8.1%	61.4%	9.5%	4.9%	21.0%	177
AST Research	151.7	6.3%	13.1%	56.1%	5.4%	3.0%	19.6%	119
Wyse Technology	128.7	7.0%	18.2%	66.4%	5.3%	3.1%	20.2%	95
Decision Industries	123.9	-10.7%	-27.8%	74.7%	5.7%	2.6%	5.5%	169
Micropolis	120.9	9.4%	12.7%	72.7%	7.5%	7.7%	69.7%	121
Control Data	97.6	0.7%	1.7%	63.3%	11.6%	5.3%	20.0%	26
Cipher Data Products	94.7	2.4%	3.1%	67.9%	11.3%	3.3%	18.4%	183
Maxtor	90.9	12.8%	10.7%	61.9%	6.7%	9.9%	16.0%	142
Dataproducts	86.9	2.6%	3.3%	64.5%	6.6%	3.2%	26.8%	107
Storage Technology	84.6	2.5%	3.1%	59.5%	8.0%	23.9%	0.0%	66
Genicom	84.2	4.2%	7.5%	64.8%	4.9%	3.1%	32.0%	116
Xidex	83.0	-7.8%	-8.4%	76.7%	2.0%	0.4%	29.9%	85
Tandon	82.4	5.9%	15.2%	70.4%	3.6%	4.2%	75.0%	120
MiniScribe	72.9	7.8%	14.0%	71.3%	5.5%	13.9%	36.1%	99
Seagate Technology	59.9	14.6%	21.3%	68.6%	3.5%	8.2%	43.6%	53
Applied Magnetics	30.5	6.7%	9.2%	64.9%	9.2%	12.1%	46.5%	144
Weighted average	**$86.1**	**3.5%**	**5.8%**	**65.6%**	**7.9%**	**7.1%**	**26.7%**	

For purposes of comparison, only companies whose electronics revenue constitutes over 70% of total revenue are included

THE ELECTRONIC BUSINESS 200

INDUSTRY SEGMENTS

Fiscal 1987 figures Company	Revenue per employee ($ thousands)	Profit as a percentage of revenue	Return on investment	Cost of goods sold as a percentage of revenue	R&D as a percentage of revenue	Capital expenditures as a percentage of revenue	Foreign revenue as a percentage of revenue	200 rank
MAINFRAMES								
Amdahl	$198.0	9.4%	15.4%	47.8%	11.9%	10.5%	44.3%	41
Cray Research	159.5	21.4%	20.2%	11.4%	15.8%	5.8%	37.0%	68
IBM	139.3	9.7%	12.0%	38.9%	10.0%	7.9%	54.0%	1
Unisys	105.0	6.0%	8.7%	32.5%	6.1%	7.4%	43.6%	5
Control Data	97.6	0.7%	1.7%	63.3%	11.6%	5.3%	20.0%	26
NCR	91.0	7.4%	17.7%	48.8%	6.3%	6.9%	54.6%	11
Weighted average	**$127.3**	**8.7%**	**11.8%**	**39.8%**	**9.4%**	**7.7%**	**50.8%**	
MINICOMPUTERS								
Stratus Computer	$150.4	10.5%	17.6%	31.7%	10.3%	7.5%	29.2%	174
Tandem Computers	147.8	10.2%	14.4%	29.6%	10.5%	13.7%	44.4%	52
IBM	139.3	9.7%	12.0%	38.9%	10.0%	7.9%	54.0%	1
Apollo Computer	138.4	3.9%	6.3%	44.5%	11.0%	9.7%	51.8%	78
Sun Microsystems	128.5	6.8%	9.0%	46.1%	12.9%	14.2%	32.0%	65
Computer Consoles	114.9	6.5%	8.1%	33.9%	14.0%	3.3%	21.4%	200
Prime Computer	109.0	6.7%	6.1%	38.2%	11.4%	10.5%	48.0%	58
MAI Basic Four	98.7	7.1%	17.6%	44.6%	4.0%	4.1%	64.1%	106
Hewlett-Packard	98.7	8.0%	10.6%	42.6%	11.1%	6.3%	49.0%	8
Gould	92.2	2.7%	3.0%	49.4%	10.1%	5.2%	38.0%	60
Digital Equipment	85.0	12.1%	17.3%	22.3%	10.8%	8.0%	47.0%	4
Data General	81.2	-6.5%	-11.7%	47.8%	12.5%	11.2%	45.0%	45
Weighted average	**$121.8**	**9.4%**	**11.9%**	**37.5%**	**10.3%**	**7.9%**	**51.9%**	
MICROCOMPUTERS								
Apple Computer	$475.2	8.2%	26.0%	46.1%	7.2%	3.2%	27.1%	22
Compaq Computer	306.0	11.1%	24.8%	56.8%	3.8%	9.3%	26.0%	47
Altos Computer Systems	196.8	6.3%	7.4%	55.9%	9.0%	18.8%	42.0%	188
AST Research	151.7	6.3%	13.1%	56.1%	5.4%	3.0%	19.6%	119
IBM	139.3	9.7%	12.0%	38.9%	10.0%	7.9%	54.0%	1
Atari	120.6	9.0%	14.2%	60.8%	3.7%	0.8%	45.9%	82
Tandy	88.5	7.0%	15.3%	47.4%	0.0%	2.7%	1.6%	17
Tandon	82.4	5.9%	15.2%	70.4%	3.6%	4.2%	75.0%	120
Zenith Electronics	67.5	-0.8%	-2.1%	83.7%	4.4%	2.3%	17.2%	29
Weighted average	**$134.8**	**9.1%**	**12.3%**	**42.0%**	**9.0%**	**7.2%**	**48.2%**	
SOFTWARE								
Ultimate	$384.1	8.0%	14.5%	49.7%	2.6%	4.6%	23.4%	159
Ashton-Tate	213.9	16.1%	23.0%	11.6%	10.5%	2.4%	30.3%	129
Microsoft	190.5	20.8%	29.2%	19.2%	11.0%	16.8%	42.3%	86
Lotus Development	138.4	18.2%	30.0%	13.4%	14.8%	6.7%	52.3%	94
Mentor Graphics	184.9	9.2%	10.5%	43.0%	10.9%	6.6%	45.9%	151
Oracle Systems	117.1	11.9%	16.1%	61.7%	6.0%	12.9%	46.8%	172
Computer Associates International	114.6	11.8%	11.1%	-8.8%	13.0%	3.4%	48.7%	74
Cullinet Software	72.6	-15.8%	-20.3%	87.8%	28.5%	6.3%	26.4%	153
Weighted average	**$154.8**	**12.2%**	**16.1%**	**26.7%**	**12.4%**	**7.5%**	**41.3%**	

For purposes of comparison, only companies whose electronics revenue constitutes over 70% of total revenue are included

The Electronic Business 200

BEST AND WORST PERFORMERS

NET INCOME/REVENUE

(percentage)

TOP 10		200 rank
Cray Research	21.4%	68
Microsoft	20.8%	86
Lotus Development	18.2%	94
Ashton-Tate	16.1%	129
Digital Communications	14.9%	160
Medtronic	14.7%	79
Seagate Technology	14.6%	53
SmithKline Beckman	13.2%	67
Maxtor	12.8%	142
Digital Equipment	12.1%	4
MEDIAN	4.7%	
BOTTOM 5		
Esterline	-11.3%	167
International Rectifier	-11.3%	197
Cullinet Software	-15.8%	153
Datapoint	-18.7%	110
Foxboro	-19.2%	128

R&D/REVENUE

(percentage)

TOP 10		200 rank
Cullinet Software	28.5%	153
Advanced Micro Devices	24.9%	57
LTX	19.2%	198
Applied Materials	17.9%	158
VLSI Technology	17.8%	184
Teradyne	16.3%	98
Cray Research	15.8%	68
Analog Devices	15.1%	97
Lotus Development	14.8%	94
Tektronix	14.3%	44
MEDIAN	5.5%	

For those 183 companies that reported research & development expenditures

RETURN ON EQUITY

(percentage)

TOP 10		200 rank
Seagate Technology	39.5%	53
SmithKline Beckman	36.0%	67
Lotus Development	35.7%	94
Compaq Computer	34.1%	47
Microsoft	30.1%	86
Computer Consoles	29.9%	200
MAI Basic Four	29.3%	106
MiniScribe	27.8%	99
Emerson Radio	27.7%	63
General Dynamics	27.3%	55
MEDIAN	11.1%	
BOTTOM 5		
Datapoint	-32.2%	110
Cincinnati Milacron	-37.2%	161
Esterline	-39.1%	167
International Rectifier	-42.2%	197
Foxboro	-51.5%	128

RETURN ON INVESTMENT

(percentage)

TOP 10		200 rank
Lotus Development	30.0%	94
Microsoft	29.2%	86
Apple Computer	26.0%	22
Compaq Computer	24.8%	47
Ashton-Tate	23.0%	129
General Dynamics	21.6%	55
Seagate Technology	21.3%	53
Ford Motor	21.0%	24
SmithKline Beckman	20.4%	67
Western Digital	20.3%	76
MEDIAN	7.5%	
BOTTOM 5		
Cullinet Software	-20.3%	153
Esterline	-21.6%	167
LTV	-25.0%	93
Decision Industries	-27.8%	169
Foxboro	-40.1%	128

REVENUE PER EMPLOYEE

($ thousands)

TOP 10		200 rank
Emerson Radio	$1,012.6	63
Dynascan	496.3	168
Apple Computer	475.2	22
Anthem Electronics	447.5	162
Ultimate	384.1	159
Intelligent Systems	333.1	189
Arrow Electronics	308.0	77
Compaq Computer	306.0	47
Marshall Industries	260.6	105
Inmac	258.5	181
MEDIAN	$96.3	
BOTTOM 5		
Loral	$47.6	61
Oak Industries	47.4	182
CTS	39.3	135
AVX	36.3	123
Applied Magnetics	30.5	144

NET INCOME PER EMPLOYEE

($ thousands)

TOP 10		200 rank
Microsoft	$39.6	86
Apple Computer	38.8	22
Ashton-Tate	34.5	129
Lotus Development	34.3	94
Cray Research	34.1	68
Compaq Computer	34.1	47
Emerson Radio	33.3	63
Ultimate	30.6	159
Tyler	30.3	84
Digital Communications	22.8	160
MEDIAN	$4.2	
BOTTOM 5		
Esterline	-$9.3	167
Cullinet Software	-11.5	153
Decision Industries	-13.2	169
Foxboro	-13.8	128
Datapoint	-21.3	110

FIVE-YEAR REVENUE GROWTH

(compounded average annual growth rate)

TOP 10		200 rank
Sun Microsystems	474.4%	65
Lotus Development	356.3%	94
AST Research	249.5%	119
Mentor Graphics	164.1%	151
MiniScribe	135.5%	99
LSI Logic	120.8%	134
Wyse Technology	102.7%	95
Stratus Computer	101.8%	174
Apollo Computer	98.2%	78
Seagate Technology	88.3%	53
MEDIAN	11.3%	
BOTTOM 5		
Datapoint	-9.3%	110
Oak Industries	-9.6%	182
ITT	-11.7%	27
Penn Central	-14.8%	109
VLSI Technology	-23.5%	184

FIVE-YEAR NET INCOME GROWTH

(compounded average annual growth rate)

TOP 10		200 rank
Micropolis	206.9%	121
Emerson Radio	145.2%	63
Apollo Computer	135.4%	78
Quantum	116.3%	177
Digital Communications	107.7%	160
Amdahl	96.1%	41
Microsoft	83.0%	86
Seagate Technology	82.5%	53
Northrop	79.9%	49
Ashton-Tate	74.0%	129
MEDIAN	9.2%	
BOTTOM 5		
Penn Central	-23.3%	109
GenRad	-25.1%	165
General Instrument	-28.1%	50
Control Data	-30.6%	26
Kollmorgen	-50.6%	136

FOREIGN REVENUE/TOTAL REVENUE

(percentage of total revenue)

TOP 10		200 rank
Datapoint	79.2%	110
Tandon	75.0%	120
Micropolis	69.7%	121
Molex	68.4%	90
MAI Basic Four	64.1%	106
Raychem	61.6%	87
Measurex	59.4%	149
Inmac	59.2%	181
NCR	54.6%	11
IBM	54.0%	1
MEDIAN	28.5%	
BOTTOM 5		
Loral	6.2%	61
Decision Industries	5.5%	169
Diasonics	3.1%	127
Dynascan	2.1%	168
Tandy	1.6%	17

CAPITAL EXPENDITURES

(percentage of net cash flow after dividends)

TOP 10		200 rank
Data General	576.1%	45
Perkin-Elmer	492.2%	46
Bolt Beranek and Newman	489.1%	122
Teradyne	374.1%	98
Westmark International	366.7%	118
LSI Logic	339.5%	134
LTX	283.6%	198
Zenith Electronics	247.3%	29
Coherent	222.4%	185
United Telecommunications	218.9%	83
MEDIAN	65.0%	
BOTTOM 5		
Datapoint	-74.1%	110
Cullinet Software	-124.9%	153
Xidex	-150.0%	85
TIE/communications	-187.6%	125
M/A-COM	-295.1%	88

THE 200: ARRIVALS AND DEPARTURES

ARRIVALS	1987 rank
Computer Associates	74
Raychem	87
Sprague Technologies	89
MAI Basic Four	106
Westmark International	118
Cullinet Software	153
Imo Delaval	163
Combustion Engineering	171
Oracle Systems	172
Stratus Computer	174
Quantum	177
Inmac	181
Oak Industries	182
VLSI Technology	184
3Com	186
Cherry Electrical	190
Gencorp	191
Brush Wellman	194
Insilco	195
LTX	198
Computer Consoles	200

DEPARTURES	1986 rank
ADT[1]	163
Allen Group	165
Analogic	170
Becton, Dickinson	181
Compugraphic[2]	92
Convergent Technologies	101
Data Card[3]	175
Ducommun[4]	87
Electrospace Systems[5]	161
Fairchild Industries	197
Kidde[6]	162
Mark Controls	185
Monolithic Memories[7]	140
North American Philips[8]	18
Spectra-Physics[9]	142
Sun Chemical[10]	191
Telex[11]	62
Tracor[12]	76
UCCEL[13]	188
Union Carbide	122
Unitrode	182

[1] acquired by Hawley Group Ltd. Oct. 5, 1987

[2] as of Jan. 2, 1988, approximately 83.6% of Compugraphic's stock was owned by Agfa-Gevaert N.V. of Belgium

[3] acquired by Seedham Inc. Sept. 4, 1987

[4] sold its electronics distribution businesses to Arrow Electronics Inc. Jan. 12, 1988

[5] acquired by Chrysler Corp. Aug. 21, 1987

[6] acquired by Hanson Trust Plc Jan. 5, 1988

[7] acquired by Advanced Micro Devices Aug. 12, 1987

[8] owned by N.V. Philips

[9] acquired by Ciba-Geigy Ltd.

[10] changed name to Sequa Corp.

[11] acquired by Memorex International N.V. Jan. 28, 1988

[12] acquired by Westmark Systems Inc. (privately held) Dec. 22, 1987

[13] acquired by Computer Associates International Inc. Aug. 20, 1987

Oh, what a beautiful fiscal year it was!

This calendar year should be a lot better. The next fiscal, a little more beautiful. No clouds will gather before 1990

For leading companies such as Avnet, Digital Equipment, SCI Systems, Seagate Technology, Tandy and Wang — all of them members of the ELECTRONIC BUSINESS 200 — fiscal year 1988 may have turned out to be their best year ever.

So it seems, judging by the indices for revenue and profits from a sample of companies that we deem representative of the industry. According to the forecast by Cahners Economics, the revenue index for fiscal 1988 will be ahead by 13% over the previous fiscal year, while profits are expected to have climbed by a whopping 43%. Six months from now, when the year ends with the calendar, their composite results may show 15% growth in revenue and a still respectable but more sedate 10% in profits.

A large portion of the growth in revenue and profits for the past 12 months came from the semiconductor manufacturers which were coming out of the 1985-1986 slump. Intel almost quadrupled its profits in the first calendar quarter, compared with 1987's, on a 61% jump in revenue. A more modest, 26% growth in revenue by Motorola doubled the company's profits. The good news for chip makers is also heralding a slowing in their pace of growth. But, for the rest of the industry, the chip makers' bonanza is very good news indeed: since components lead the electronics market, it's now the other companies' turn to grow fast. This may mean that growth in the fiscal year 1989 will come from makers of computers and communications systems.

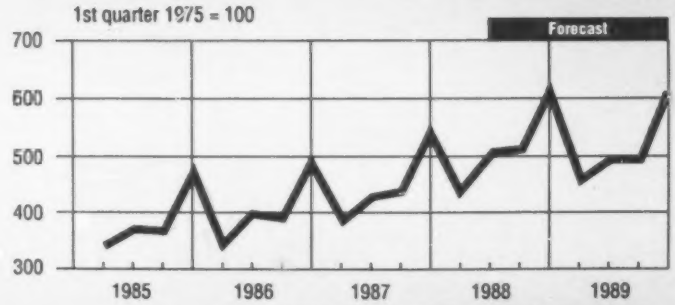
The ELECTRONIC BUSINESS leading indicator, which appears in the first issue of every month, provides a clue to the duration of this growth. Our indicator peaked last October at 120.3, indicating that the three-month period that ended in October 1987 was 20.3% higher than for the previous three months. According to Cahners' senior economist Elizabeth Baatz, it is expected to bottom out more than two years later. The emphasis here is on "leading." Our indicator leads U.S. semiconductor sales by up to nine months. That is, if the growth in chip sales has not slowed down yet, it is about to do so. The emphasis here is on "growth," because the indicator measures a rate of change. When it started going down last November, it signaled that growth in semi shipments will start to diminish about nine months later, not that sales will decline.

The rest of the electronics industry lags chip sales. Next are the makers of printed circuit board assembly equipment. Computer shipments follow, once the chips and the boards computer makers bought are assembled. So Apple's and IBM's sales will grow fast in the rest of this year: their growth may peak in the last calendar quarter and then go on at a slower pace for another year.

Last in the cycle are the manufacturers of capital equipment for the semiconductor industry. Chip makers have now used the huge overcapacity they had at the end of the recession in 1986. Capital equipment makers are now beginning to enjoy the good business their customers have had for over a year, and can look forward to brisk growth in revenue for the next 12 months. By then, says Baatz, our leading indicator will cross the 100 line, signaling that semiconductor shipments for the first quarter of 1990 may not grow with respect to the last quarter of 1989. But, even then, computer makers will still be doing well; capital equipment companies even better.

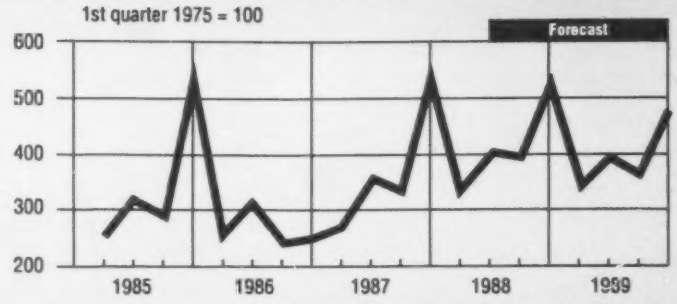
ALBERTO SOCOLOVSKY

ELECTRONIC BUSINESS revenue index



Historical data: ELECTRONIC BUSINESS; Forecast: Cahners Economics

ELECTRONIC BUSINESS profits index

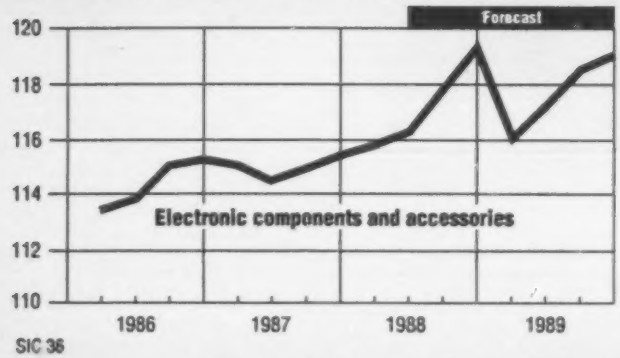


Historical data: ELECTRONIC BUSINESS; Forecast: Cahners Economics

PPI passive components — July 15

Producer price index — Electronic components

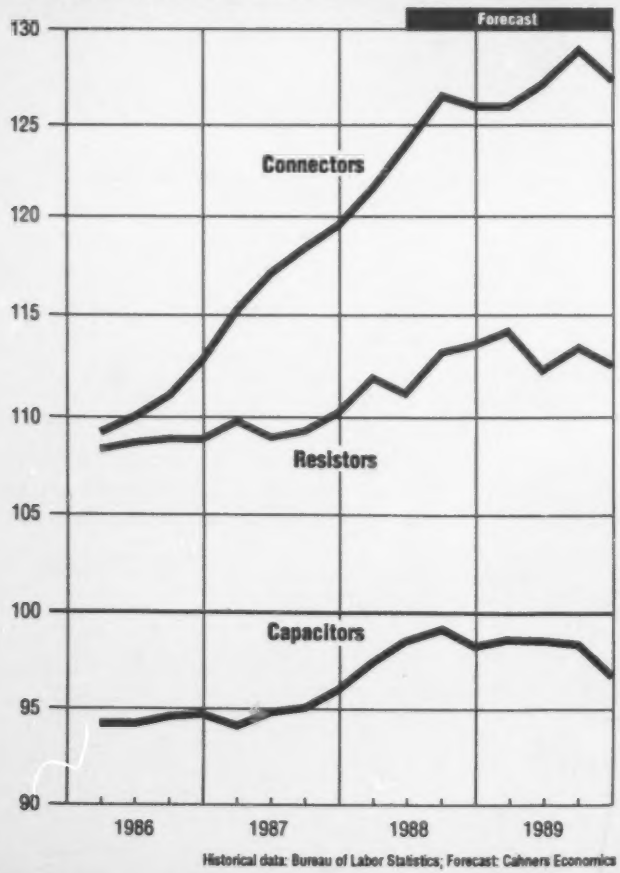
Quarterly averages, 1st quarter 1982 = 100



Historical data: Bureau of Labor Statistics; Forecast: Cahners Economics

Producer price indexes — Passive components

Quarterly averages, 1st quarter 1982 = 100



Historical data: Bureau of Labor Statistics; Forecast: Cahners Economics

Abundant supplies cap prices for passives

While DRAMS and 1Mb memory devices may be in short supply, abundant supplies of passive devices are holding passive prices down. After rising only 0.5% in 1987, producer prices of all electronic components appear headed for just a 2% price increase in 1988.

According to the U.S. Bureau of Labor Statistics, producer prices of capacitors jumped 3.7% in the first quarter of 1988, compared with a year ago. This was the largest quarterly price increase in several years. Part of the increase, however, is due to the low level of prices in the first quarter of 1987. Prices then were at their lowest in many years, following price declines in 1985 and 1986.

Leadtimes for capacitors stood at 7.5 weeks in June 1988, up from 5 weeks a year earlier. This lengthening in delivery times means producers of capacitors will have some leeway to increase their prices. The high percentage of capacitors which are sourced abroad is also fueling the 1988 price rise. Rising values of foreign currency as the U.S. dollar depreciates means foreign import prices have risen.

Price increases for resistors, which were weak in the middle of 1987, are back on the fast track in 1988. A 1.8% first quarter upturn in resistor producer prices presages somewhat higher price increases later in 1988.

Still, leadtimes for resistors have barely budged from June 1987 to June 1988, remaining around the five-week range. Stable leadtimes suggest supply and demand for resistors are fairly in balance. So the upward pressure on resistor prices may not be long-lived, particularly in 1989.

Connector prices, which rose 6.3% in 1987, jumped 5.4% in the first quarter of 1988. According the Labor Department surveys, connector prices have seen the fastest price increases of the passive components tracked here each month. Connector leadtimes, which stood at 6.8 weeks in June of 1987, inched up to 7.3 weeks this past June. Still three weeks below its 1984 peak, delivery times for connectors indicate few supply imbalances.

Of course, a fast delivery time for the passive components and reasonable price increases mean nothing to the computer manufacturer if the crucial memory devices are in short supply, causing prices to double. But for practical management purposes, at least you can ignore the passive price forecast while you concentrate on tracking down DRAMs.

Full-fledged recovery

Computer and office machinery makers are in full-fledged recovery right now. First-quarter new orders totaled $16.6 billion, a 26% increase compared with the same quarter last year. Shipments have picked up the tempo too, surging 24% in the first quarter from a year ago. With computers and peripherals still on top of the shopping lists of many businesses, the buying spree isn't over yet.

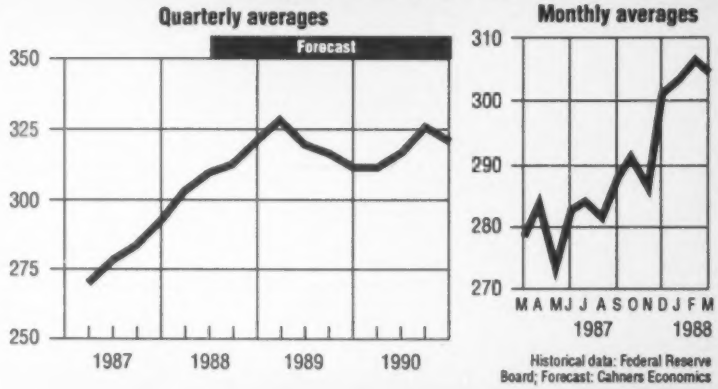
Growth in new orders and shipments will increase at an accelerating rate through the rest of this year. In 1989 and 1990, the slowdown in the U.S. economy and durable equipment investment will negatively affect the computer and office machinery industry.

However, this slump will be shorter and milder compared with the 1985-1986 plunge. Because inventory has been cautiously managed, excessive buildup will not be squeezing off production. Furthermore, with the dollar value low, exports will help stabilize sales.

More information can be obtained from Madeline Franchi, senior economist, Cahners Economics Department, 275 Washington St., Newton, MA 02158. Phone: (617) 964-3030.

Computers and office machinery — Industrial production

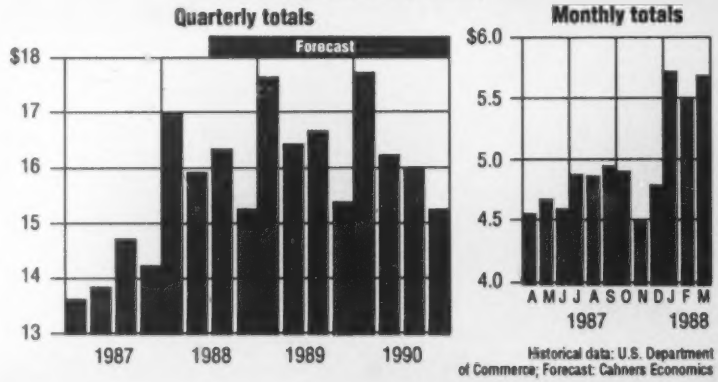
Seasonally adjusted index, 1977 = 100



Historical data: Federal Reserve Board; Forecast: Cahners Economics

Computers and office machinery — Shipments

Seasonally adjusted ($ billions)



Historical data: U.S. Department of Commerce; Forecast: Cahners Economics

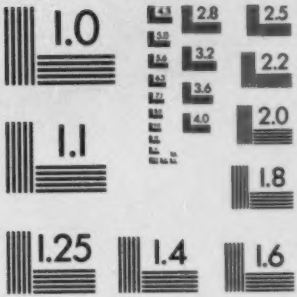
Computer market database

	Latest month	Previous month	Change	Year ago	Change	Next year	Change
Industrial production (SA,1977=100, March)	305.4	307.1	-0.55%	278.8	+9.54%	330.0	+8.06%
Shipments (SA, $ millions, March)	$5,708	$5,531	+3.20%	$4,553	+25.37%	$5,884.0	+3.08%
New orders (SA, $ millions, March)	$5,288	$5,347	-1.10%	$4,686	+12.85%	$5,744	+8.62%
Unfilled orders (SA, $ millions, March)	$18,475	$18,895	-2.22%	$18,763	-1.53%	$19,193	+3.88%
Inventory-to-shipment ratio (SA, March)	1.79	1.83	—	2.12	—	1.84	—
All employees (thousands, March)	470.9	470.3	+0.13%	455.7	+3.34%	492.4	+4.57%
Production workers (thousands, March)	153.4	152.4	+0.66%	147.7	+3.86	156.2	+1.79%
Exports ($ millions, February)	$1,733	$1,719	+0.82%	$1,385	+25.11%	$1,872	+8.00%
Imports ($ millions, February)	$1,849	$1,616	+14.46%	$1,368	+35.23%	$1,869	+1.10%

SA = seasonally adjusted, all other data is not seasonally adjusted

Data sources: Federal Reserve Board, U.S. Bureau of the Census and U.S. Bureau of Labor Statistics
All data for SIC 357, except industrial production, SIC 357-9. Forecasts: Cahners Economics

MICROCOPY RESOLUTION TEST CHART
NBS - 1010a
(ANSI and ISO TEST CHART No. 2)



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